

ANNUAL REPORT OF THE
GOVERNOR OF THE
PANAMA CANAL, 1934

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ANNUAL REPORT
OF THE
GOVERNOR OF
THE PANAMA CANAL
FOR THE
FISCAL YEAR
ENDED JUNE 30
1934



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1934

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CHONGMING
WILDERNESS
VIA AIRPORT

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REPORTS OF HEADS OF DEPARTMENTS AND DIVISIONS

APPENDICES NOT PRINTED

The material in the annual report of the Governor of the Panama Canal, published in this volume, is to a large extent a summary of data presented in annual reports from the heads of departments and divisions in the Canal organization; the latter, regarded as appendixes to the report of the Governor, are not printed. The annual report of the Panama Railroad Co. is published separately. The reports of the heads of departments and divisions, as listed below, may be consulted at the Washington office of the Panama Canal or the office of the Governor at Balboa Heights, Canal Zone:

Engineer of maintenance, report of—

 Dredging division, report of superintendent.

 Madden Dam division, report of construction engineer.

Assistant engineer of maintenance, report of—

 Electrical division, report of electrical engineer.

 Municipal engineering division, report of municipal engineer.

Division of lock operation:

 Atlantic locks, report of assistant superintendent.

 Pacific locks, report of assistant superintendent.

Office engineer, report of.

Section of surveys, report of chief.

Gatun Dam and backfills, report of supervisor.

Marine division, report of marine superintendent.

Mechanical division, report of superintendent.

Supply department, report of chief quartermaster.

Accounting department, report of auditor.

Health department, report of chief health officer.

Executive department:

 Division of civil affairs, report of chief.

 Police and fire division, report of chief.

 Division of schools, report of superintendent.

 Bureau of clubs and playgrounds, report of general secretary.

 Surveying officer, report of.

Magistrates' courts:

 Magistrate, Cristobal, report of.

 Magistrate, Balboa, report of.

District attorney, report of.

District court, report of clerk.

Marshal, report of.

Land agent, the Panama Canal and Panama Railroad Co., report of.

Purchasing department, report of the general purchasing officer and chief of Washington office.

Public defender, report of.

ANNUAL REPORT
OF THE
GOVERNOR OF THE PANAMA CANAL

BALBOA HEIGHTS, CANAL ZONE,

November 6, 1934.

The SECRETARY OF WAR,

Washington, D. C.

SIR: I have the honor to submit the report of the Governor of the Panama Canal for the fiscal year ended June 30, 1934.

Need of enactment of two laws to remove obstacles to the most effective operation of the Canal is discussed in section III. One of these is to provide for disability pay for alien employees who have arrived at physical unfitness for effective work and should be removed from the rolls. The other is for the adoption of a more equitable, precise, and controlled method of levying tolls on vessels using the Canal, so as to render justice to all users of the Canal and also to protect the revenue due the Government. Both have been explained fully in more extensive form than is practicable in this report. Enactment by Congress of legislation to attain these improvements is earnestly recommended.

Respectfully,

J. L. SCHILEY, *Governor.*

SUMMARY

Administration of the Panama Canal involves three main elements: (a) The operation and maintenance of the Canal proper, which primarily involves the maintenance of the waterway, the operation of the locks, and the control of traffic; (b) the operation of auxiliary business enterprises necessary for shipping and the Canal force, such as coal and fuel oil plants, storehouses for food-stuffs, ships' chandlery, and other essential supplies, marine and railway repair shops, terminal facilities for the transshipment of cargo and passengers, operation of the Panama Railroad on the Isthmus and the Panama Railroad Steamship Line between New York and the Isthmus, quarters for the working force, and other adjuncts

essential to the economical and efficient operation of the Canal, the majority of which elsewhere would commonly be conducted by private enterprise; and (c) the administration of the government of the Canal Zone, populated by 8,633 American civilians, 9,859 Americans in military and naval forces, and 21,331 natives and West Indians, in which administration are embraced education, sanitation, hospital service, police and fire protection, customs, quarantine, immigration services, post offices, etc.

The immediate administration of these various activities rests with the heads of nine major departments and divisions reporting to the Governor, in whom is centered responsibility and control for the entire organization.

OPERATION AND MAINTENANCE OF THE CANAL

The primary function of the Panama Canal is to provide and maintain a waterway by means of which vessels may make the transit from one ocean to the other, and to handle such traffic as presents itself for transit with a maximum of safety and a minimum of delay. Throughout the year the Canal force maintained its high standard of expeditious service not only in the actual transiting of ships but in providing emergency repairs, fuel, supplies, and the various supplementary services incidental to shipping.

There were no interruptions to traffic during the year.

BUSINESS OPERATIONS

Secondary only to the operation of the Canal is the function of supplying various services to shipping. Commerce requires at the Canal certain adjuncts essential to shipping, such as fuel-oil plants, coaling stations, drydocks, marine repair shops, terminal facilities for the transshipment of cargo, storehouses for the purchase of ships' chandlery, commissaries for the replenishment of food supplies, and similar essential services. These services, under coordinated and centralized control, are provided by the various business units of the Panama Canal and Panama Railroad Co. The coordination of such services with the transit of ships through the Canal assists materially in the efficient and economical operation of the waterway. Moreover, in providing marine repair facilities, fuel, and other supplies at reasonable cost, the operation of these business units promotes traffic through the Canal.

ADMINISTRATION—GOVERNMENT

The usual functions of Government, such as schools, police and fire protection, quarantine, public health, immigration service, posts,

customs, aids to navigation, steamboat inspection, hydrographic and meteorological work, water supply, sewers, construction and maintenance of streets, and similar activities which, in the United States, are directed by various officers of the national, State, and municipal governments, are entrusted in the Canal Zone to the Governor, and are executed under his authority and responsibility. This centralization of all governmental activities under one head simplifies the problem of economical and efficient administration.

SERVICES RENDERED BY THE CANAL TO SHIPPING

The most important items of the business of the Canal and its adjuncts, covering principal services to shipping are expressed numerically in the following table, which presents a comparison of the activities during the fiscal year 1934 with the 2 years immediately preceding:

	Fiscal year 1932	Fiscal year 1933	Fiscal year 1934
Transits of Canal by ships paying tolls.....	4,506	4,494	5,533
Free transits of ocean vessels.....	473	445	503
Total transits of ocean vessels.....	4,979	4,939	6,036
Transits of launches, not counted in commercial traffic.....	94	105	175
Number of lockages during year:			
Gatun Locks.....	4,615	4,380	.5,365
Pedro Miguel Locks.....	4,842	4,557	5,507
Miraflores Locks.....	4,826	4,505	5,483
Tolls levied on ocean vessels.....	\$20,707,377.05	\$19,620,458.53	\$24,063,789.45
Tolls on launches (not included in above).....	\$478.94	\$752.23	\$1,913.57
Total tolls.....	\$20,707,855.99	\$19,621,210.76	\$24,065,703.02
Cargo passing through Canal (tons).....	19,807,998	18,177,728	24,718,651
Net tonnage (Panama Canal measurement) of transiting vessels.....	23,625,419	22,821,876	28,566,595
Cargo per net ton of ocean vessels, including those in ballast.....	.8384	.7965	.8653
Average tolls per ton of cargo, including tolls on vessels in ballast.....	\$1.0454	\$1.0794	\$0.9735
Average tolls per Panama Canal net ton of vessel measurement, including vessels in ballast.....	\$0.8765	\$0.8597	\$0.8423
Calls at Canal ports by ships not transiting Canal.....	874	854	989
Cargo handled and transferred at ports (tons).....	989,534	1,026,128	1,157,649
Coal, sales and issues (tons).....	65,463	39,327	52,657
Coal, number of commercial ships bunkered.....	277	197	196
Fuel oil pumped (barrels).....	7,767,356	6,022,663	9,710,247
Fuel oil—number of ships served, other than vessels operated by the Panama Canal.....	1,407	1,188	1,724
Ships repaired, other than Panama Canal equipment.....	593	501	513
Ships drydocked, other than Panama Canal equipment.....	125	89	49
Provisions sold to commercial ships (commissary sales).....	\$458,943.30	\$294,416.69	\$330,570.82
Chandlery sold to ships (storehouse sales).....	\$33,895.95	\$26,386.27	\$28,165.99

REVENUES AND EXPENSES

The net revenues from Canal operations proper were \$16,810,-348.06, as compared with \$10,775,500.75 last year. Net revenues from business operations under the Panama Canal for 1934 were \$1,366,755.12. The combined net revenues accruing from the Canal and its business units totaled \$18,177,103.18. The capital investment

at the beginning of the fiscal year was \$539,200,059.23, and the net revenue represented a return of 3.37 percent on the investment, as compared with 2.23 percent the preceding year.

The foregoing figures do not include the operations carried on with funds of the Panama Railroad Co.; these resulted in a net profit of \$1,156,738.14 for the year, as compared with \$784,432.28 for the preceding year, an increase of \$372,305.86.

EARNINGS AND REPLACEMENTS

With respect to the operations of the Panama Canal, the showing as to earnings and expenses, considered by itself, is gratifying, but lest it be made the basis of premature optimism, it should be explained that the major part of the increased return is due to temporary reductions in salary and wage scales enforced under the economy act and now largely restored, and to postponements of channel dredging current maintenance, now accumulated to a point where this essential work cannot longer be deferred.

Analysis of the operating statistics for the past year show that, notwithstanding a substantial increase in tolls receipts, which normally would be accompanied by increased operating expenses, actually such expenses were sharply reduced, which clearly reflects an abnormal condition. Even as this report is being written, advance compilations of net revenue for the first month of the new fiscal year indicate a net return of only 2.66 percent. The Canal administration is therefore faced with the fact that, except for the strained efforts of the past year, net earnings since 1930 have continued below 3 percent of the capital investment, accepted as the minimum of fair return.

The past fiscal year marked the close of 20 years of successful operation of the Panama Canal; in fact, its dependable and efficient service in shortening the highways of the world's commerce is now taken for granted.

One of the elements which have made this possible is the high state of maintenance in which all wearing and deteriorating parts are kept. It is estimated that of the total capital values of the Panama Canal there are approximately \$150,000,000 of general structural values subject to deterioration and requiring regular repair and periodical replacement, but without reserve funds from operating revenues by which to defray the costs thereof. These have been in service for 20 years.

Some of this property, such as dams, breakwaters, and concrete buildings, is still in excellent condition and requires but little expenditure for upkeep; but on other portions deterioration has reached a point where replacement should not longer be deferred.

These necessary replacements include not only the frame buildings originally erected to serve during the period of the construction of the Canal but also docks, highways, etc., which, due to ordinary deterioration and to earth slides and other unforeseen conditions, have been rendered inadequate or unserviceable for present requirements or uneconomical to maintain.

There seems to be a general misunderstanding that because the earnings of some of the activities of the Canal are authorized for reexpenditures by the Governor, all necessary replacements can be financed from this source. This is far from true as such earnings are comparatively small in amount and may be reexpended only upon the plant facilities from which the earnings were derived. The general structures I refer to are those which are not directly self-supporting, but which, nonetheless, are essential to the primary function of the Canal in the earning of tolls, which revenue must be covered directly into the Treasury, thus replacement funds are not available for this most essential property, save by direct appropriation by the Congress.

As a result of this limitation upon Canal fiscal policy, while it has been generally possible to maintain the self-supporting auxiliary plant structures in a satisfactory manner, the economies enforced on the Canal during the last few years through failure to provide the replacement funds requested for other structures has created a condition of deferred maintenance which is poor economy and cannot be continued without threatening the efficiency of the Canal.

SECTION I

CANAL OPERATION AND TRADE VIA PANAMA CANAL

TRAFFIC IN 1934

Transits of commercial vessels, 5,533, were 1,039 more than in 1933, a gain of 23.1 percent, and the daily average transits rose from 12.31 to 15.16. This compares with 12.31 in 1932, 15.15 in 1931, 16.95 in 1930, 17.37 in 1929, and 17.63 in the peak year of 1928. The four main features of traffic statistics all made gains over the previous fiscal year as follows: Transits, 23.1 percent; net tonnage. Panama Canal measurement, 25.2 percent; tolls, 22.6 percent; cargo tonnage, 36 percent. Transits and net tonnage were higher than any year since 1930, and tolls and cargo since 1931.

The history of Canal traffic has reflected five distinct trends in the world's economic and commercial developments. After the opening of the Canal on August 15, 1914, there was a slow growth through 8 years, in which the maximum of transits was 2,892 in 1921. The rise in California oil production was primarily responsible for raising the transits to 3,967 in 1923 and 5,230 in 1924. Traffic continued at about this level until the business expansion brought a considerably increased volume toward the end of the last decade when transits reached the peak of 6,456 in 1928, tolls \$27,127,376.91, cargo 30,663,006 tons in 1929, and Panama Canal net tonnage 29,980,614 in 1930. From these levels, the world-wide depression brought on a sharp restriction of traffic until the volume dropped to 10.13 in daily average transits and \$46,479 in daily average tolls (August 1932). A gradual increase from that point was made, coincident with the general improvement in economic conditions, and total traffic for the fiscal year 1933 very nearly equaled that of the previous year. Throughout 1934 the gains were more pronounced, each month being substantially higher than the corresponding month of the previous year, and each month in 1934 being higher than the previous month in daily average number of transits from the beginning of the year (July 1933) until March 1934, after which three successive monthly declines occurred to the end of the year. The decline was particularly marked in June, when the number of transits dropped off 99 less than the previous month and were 70 less than the monthly average of 461. Strikes on the west coast which tied up shipping, and seasonal factors, are believed responsible for much of this loss.

In the fiscal year 1934 the transits of naval and other public vessels of the United States Government, public vessels of the Colombian and Panamanian Governments, and vessels transiting solely for repairs, none of which pay tolls, numbered 503, as compared with 445 in 1933. The total of toll-paying and free transits combined, which includes all seagoing vessels of 20 tons or more, numbered 6,036, in comparison with 4,939 in 1933, making daily averages of 16.53 and 13.53, respectively.

Net tonnage of the commercial vessels passing through the Canal in 1934 aggregated 28,566,595 tons, Panama Canal measurement, an increase of 25.2 percent in comparison with 1933. Tolls in 1934 amounted to \$24,063,789.45, increasing 22.6 percent in comparison with tolls in the preceding year.

The percentage gain over the previous year in net tonnage (Panama Canal measurement) was higher than the percentage increase in transit, due to a slightly higher average net ton per vessel. The proportion of small vessels under 100 tons was 4 percent of the total whose tolls are based on net tonnage, compared with 5.3 percent in 1933.

Both transits and Canal net tonnage showed greater percentage increases than the tolls collected, which was possible because of the effect of the proviso limiting the tolls collectible to \$1.25 times the net tonnage as measured under the rules for registry in the United States.

Cargo carried through the Canal in 1934 amounted to 24,718,651 tons and was 36 percent higher than the cargo in 1933. Traffic in both directions contributed nearly equally to the increase in cargo tonnage, the gain in shipments from the Atlantic to Pacific being 36.7 percent, and from the Pacific to the Atlantic 35.7 percent. This phase of the traffic is discussed in detail under "trade routes and cargo."

The receipts from tolls reported by the accounting department for the fiscal year 1934 were \$24,065,065.16. This figure includes tolls on launches, which are not included in "commercial traffic" of ocean-going ships, and also has been adjusted in accordance with refunds for overcharges and supplemental collections in the event of undercharges. These items account for the difference of \$1,275.71 between the accounting figures and the figure for tolls levied on commercial traffic as reported in the following studies of traffic, which are based on tolls levied at the time of transit.

Commercial traffic figures for each fiscal year since the Canal was opened to navigation are shown in the table below:

Fiscal year ended June 30—	Number of transits	Panama Canal net tonnage	Tolls	Tons of cargo
1915 ¹	1,075	3,792,572	\$4,367,550.19	4,888,454
1916 ²	758	2,396,162	2,408,089.62	3,094,114
1917.....	1,803	5,798,557	5,627,463.05	7,058,563
1918.....	2,069	6,574,073	6,438,853.15	7,532,031
1919.....	2,024	6,124,990	6,172,828.59	6,916,621
1920.....	2,478	8,546,044	8,513,933.15	9,374,499
1921.....	2,892	11,415,876	11,276,889.91	11,599,214
1922.....	2,736	11,417,459	11,197,832.41	10,884,910
1923.....	3,957	18,605,786	17,508,414.85	19,567,875
1924.....	5,230	26,148,875	24,290,963.54	26,994,710
1925.....	4,673	22,855,151	21,400,523.51	23,958,836
1926.....	5,197	24,774,591	22,931,055.98	26,037,448
1927.....	5,475	26,227,815	24,228,830.11	27,748,215
1928.....	6,456	29,458,634	26,944,499.77	29,630,709
1929.....	6,413	29,837,794	27,127,376.91	30,663,006
1930.....	6,185	29,980,614	27,076,890.01	30,030,232
1931.....	5,529	27,792,146	24,645,456.57	25,082,800
1932.....	4,506	23,625,419	20,707,377.05	19,807,998
1933.....	4,494	22,821,576	19,620,455.53	18,177,728
1934.....	5,533	28,566,595	24,063,789.45	24,718,651
Total.....	77,493	366,761,032	336,549,076.35	363,766,614

¹ Canal opened to traffic Aug. 15, 1914.

² Canal closed to traffic approximately 7 months of fiscal year by slides.

TRAFFIC BY MONTHS

The commercial traffic during each month of the fiscal year is summarized in the following table, in which are inserted for comparison the figures for the preceding year:

Month	Number of vessels		Panama Canal net tonnage		Tolls		Tons of cargo	
	1932-33	1933-34	1932-33	1933-34	1932-33	1933-34	1932-33	1933-34
July.....	326	401	1,676,492	2,051,128	\$1,468,728.36	\$1,732,164.93	1,259,981	1,699,039
August.....	314	416	1,658,112	2,159,995	1,440,848.87	1,829,754.49	1,349,453	1,914,014
September.....	353	408	1,868,391	2,096,538	1,598,265.98	1,758,587.41	1,347,144	1,797,497
October.....	394	467	1,988,133	2,416,200	1,714,779.06	2,036,909.16	1,582,261	2,125,927
November.....	388	463	2,035,796	2,395,359	1,756,865.84	2,001,692.77	1,531,509	1,949,913
December.....	431	496	2,080,069	2,617,656	1,781,940.03	2,204,134.64	1,621,581	2,191,683
January.....	415	500	2,069,218	2,582,131	1,762,808.56	2,160,679.83	1,463,503	2,087,292
February.....	368	468	1,832,658	2,462,760	1,575,708.35	2,079,696.80	1,434,862	2,124,440
March.....	399	538	1,989,044	2,703,372	1,718,908.41	2,281,485.72	1,738,227	2,465,387
April.....	370	495	1,839,597	2,493,606	1,554,250.14	2,121,678.33	1,527,978	2,291,392
May.....	372	490	1,883,249	2,567,555	1,617,943.65	2,148,026.66	1,629,982	2,303,411
June.....	364	391	1,901,117	2,020,295	1,629,411.28	1,708,978.71	1,691,247	1,768,656
Total.....	4,494	5,533	22,821,876	28,566,595	19,620,458.53	24,063,789.45	18,177,728	24,718,651
Average per month.....	374.5	461.1	1,901,823	2,380,550	1,635,038.21	2,005,315.79	1,514,811	2,059,888

TANKER TRAFFIC

Transits of tank ships during the fiscal year 1934 totaled 942, an increase of 306, or 48.1 percent in comparison with the 1933 total of 636. Tanker transits in 1934 comprised 17 percent of the total commercial transits, made up 20.4 percent of the total net tonnage (Pan-

ama Canal measurement), paid 21.5 percent of the total tolls collected, and carried 23.9 percent of the cargo which passed through the Canal.

Cargo carried through the Canal in tank ships during the fiscal year 1934 amounted to 5,909,531 tons, in comparison with 3,808,067 in 1933, an increase of 2,101,464 tons, or 55.2 percent. Segregation of the 1934 traffic by direction of transit shows that 377,666 tons of tanker cargo went through from the Atlantic to the Pacific, and 5,531,865 tons from the Pacific to the Atlantic.

Of the total mineral oil cargoes carried through the Canal during the fiscal year 1934, approximately 27 percent was gasoline, benzine, and naphtha; 23 percent crude oil; 41 percent gas and fuel oils; and the remainder, 9 percent, lubricating oils and kerosene.

The three tables below, which begin with the fiscal year 1923 and thus cover the period during which tankers have been an important component of the traffic through the Canal, show the composition of the traffic as divided between tank ships and all other commercial or toll-paying vessels, indicated here as "general." The tables show the number and daily averages of the two classes, and of the total; the quantities and proportions of net tonnage; and the amounts and proportion of tolls:

Number and daily average transits of tankers and general carriers

Fiscal year	Commercial transits			Daily average transits		
	Tankers	General	Total	Tankers	General	Total
1923.....	913	3,054	3,967	2.5	8.4	10.9
1924.....	1,704	3,526	5,230	4.7	9.6	14.3
1925.....	1,079	3,594	4,673	3.0	9.8	12.8
1926.....	1,090	4,107	5,197	3.0	11.2	14.2
1927.....	1,324	4,151	5,475	3.6	11.4	15.0
1928.....	1,121	5,335	6,456	3.0	14.6	17.6
1929.....	1,083	5,330	6,413	3.0	14.6	17.6
1930.....	1,218	4,967	6,185	3.3	13.6	16.9
1931.....	944	4,585	5,529	2.6	12.6	15.2
1932.....	612	3,894	4,506	1.7	10.6	12.3
1933.....	636	3,858	4,494	1.7	10.6	12.3
1934: July.....	58	343	401	1.9	11.0	12.9
August.....	59	357	416	1.9	11.5	13.4
September.....	63	345	408	2.1	11.5	13.6
October.....	79	388	467	2.6	12.5	15.1
November.....	56	377	463	2.9	12.5	15.4
December.....	88	408	496	2.8	13.2	16.0
January.....	80	420	500	2.6	13.5	16.1
February.....	81	387	468	2.9	13.8	16.7
March.....	92	446	538	3.0	14.4	17.4
April.....	86	409	495	2.9	13.6	16.5
May.....	95	395	490	3.1	12.7	15.8
June.....	75	316	391	2.5	10.5	13.0
Total.....	942	4,591	5,533	2.6	12.6	15.2

Proportions of tanker and general net tonnage

Fiscal year	Panama Canal net tonnage			Percentage of total net tonnage		
	Tankers	General	Total	Tankers	General	Total
1923-----	5,374,384	13,231,402	18,605,768	28.9	71.1	100.0
1924-----	10,212,047	15,936,831	26,148,578	39.1	60.9	100.0
1925-----	6,424,622	16,430,529	22,855,151	28.1	71.9	100.0
1926-----	6,343,240	18,431,351	24,774,591	25.5	74.5	100.0
1927-----	7,624,112	18,603,703	26,227,815	29.1	70.9	100.0
1928-----	6,243,969	23,214,665	29,458,634	21.2	78.8	100.0
1929-----	5,844,263	23,993,531	29,837,794	19.6	80.4	100.0
1930-----	6,564,138	23,416,476	29,980,614	21.9	78.1	100.0
1931-----	5,284,873	22,507,273	27,792,146	19.0	81.0	100.0
1932-----	3,570,398	20,055,021	23,625,419	15.1	84.9	100.0
1933-----	3,808,784	19,013,092	22,821,876	16.7	83.3	100.0
1934-----	5,811,995	22,744,600	28,556,595	20.4	79.6	100.0

Proportions of tolls from tank ships and from all other vessels

Fiscal year	Tolls paid by shipping using Canal			Percentage of total tolls		
	Tankers	General	Total	Tankers	General	Total
1923-----	\$4,769,324.63	\$12,738,874.94	\$17,508,199.57	27.2	72.8	100.0
1924-----	9,071,835.65	15,219,127.89	24,290,963.54	37.3	62.7	100.0
1925-----	5,728,302.26	15,672,221.25	21,400,523.51	26.8	73.2	100.0
1926-----	5,626,167.93	17,304,888.05	22,931,055.98	24.4	75.6	100.0
1927-----	6,658,806.90	17,570,023.21	24,228,830.11	27.5	72.5	100.0
1928-----	5,436,437.16	21,508,062.61	26,944,499.77	20.1	79.9	100.0
1929-----	5,145,632.19	21,981,744.72	27,127,376.91	18.9	81.1	100.0
1930-----	5,768,963.28	21,307,926.73	27,076,890.01	21.3	78.7	100.0
1931-----	4,682,320.14	19,963,136.43	24,645,456.57	19.0	81.0	100.0
1932-----	3,197,136.29	17,510,240.76	20,707,377.05	15.4	84.6	100.0
1933-----	3,393,311.02	16,227,147.51	19,620,458.53	17.3	82.7	100.0
1934-----	5,161,787.40	18,902,002.05	24,063,789.45	21.5	78.5	100.0

NATIONALITY OF VESSELS

Segregation of the traffic through the Canal during the fiscal year 1934, by nationality, and showing transits, measurement tonnage, tolls, and tons of cargo, is presented in the following table:

Commercial traffic through the Panama Canal, by nationality of vessels

Nationality	Number of ships	Measurement tonnage				Tolls	Tons of cargo		
		Panama Canal net	United States equivalent	Registered					
				Gross	Net				
British.....	1,208	6,831,307	4,881,600	8,146,405	4,931,037	\$5,757,319.25	5,193,136		
Chilean.....	7	26,680	21,190	34,575	19,618	23,508.52	21,989		
Colombian.....	1	307	302	405	308	226.50	-		
Danish.....	135	636,831	419,001	702,680	434,450	501,632.90	533,262		
Danzig.....	70	559,101	478,953	848,915	480,944	500,593.30	575,125		
Finnish.....	7	31,811	21,498	34,948	21,269	25,154.58	25,560		
French.....	92	509,467	329,432	613,791	343,282	404,744.36	430,668		
German.....	301	1,059,731	705,116	1,216,350	718,059	871,137.96	962,218		
Greek.....	13	54,026	36,999	59,828	36,946	43,061.97	60,799		
Honduran.....	9	432	414	378	342	448.68	183		
Italian.....	68	478,429	317,010	587,153	351,681	378,443.07	256,465		
Japanese.....	258	1,413,305	1,133,535	1,759,794	1,116,220	1,378,227.43	1,510,916		
Mcxieau.....	1	-	-	-	-	613.50	-		
Netherlander.....	91	535,315	356,512	590,823	355,521	441,367.22	403,451		
Norwegian.....	450	2,236,955	1,476,971	2,477,331	1,485,180	1,748,481.84	2,080,833		
Panamanian.....	383	287,187	218,802	388,972	219,694	239,398.70	150,667		
Peruvian.....	14	17,823	15,176	24,086	14,263	22,317.30	9,104		
Russian.....	3	1,559	2,779	5,756	2,744	2,084.25	-		
Spanish.....	1	-	-	-	-	1,648.50	-		
Swedish.....	122	569,495	391,555	1,005,950	481,474	451,361.30	766,921		
United States.....	2,269	13,225,698	9,473,099	15,761,429	9,457,363	11,186,953.53	11,578,453		
Venezuelan.....	12	10,156	9,304	16,927	9,774	9,461.04	7,221		
Yugoslav.....	18	80,980	60,483	97,340	59,625	75,603.75	151,680		
Fiscal year:									
1934.....	5,533	28,566,595	20,348,641	34,373,836	20,539,794	24,063,789.45	24,718,651		
1933.....	4,494	22,821,876	16,368,930	27,185,332	16,537,108	19,620,458.53	18,177,728		
1932.....	4,506	23,625,419	17,207,789	28,770,941	17,386,148	20,707,377.05	19,807,998		

The following table shows the aggregate cargo carried through the Canal by ships of the principal nationalities engaged in the traffic, for the past 5 years, and the percentage of the total cargo which each group carried during the fiscal year 1934:

Tons of Cargo Carried

	1930	1931	1932	1933	1934	
					Tons	Percent-age
United States.....	14,499,233	11,805,132	8,835,055	7,987,739	11,578,453	46.8
British.....	7,572,969	5,971,281	4,638,068	4,170,995	5,193,136	21.0
Norwegian.....	1,808,278	1,720,383	1,427,284	1,773,161	2,080,833	8.4
Japanese.....	1,009,735	1,104,512	1,031,704	1,159,733	1,510,916	6.1
German.....	1,388,022	1,261,763	1,078,738	813,231	962,218	4.0
Swedish.....	832,273	721,945	761,015	403,169	766,921	3.1
Danzig.....	192,734	185,982	238,884	347,934	575,125	2.3
Danish.....	505,914	606,100	521,481	448,863	533,262	2.2
French.....	576,753	508,011	338,786	249,395	430,668	1.7
Netherland.....	618,718	477,769	440,870	381,071	403,451	1.7
Italian.....	264,223	236,570	215,139	189,371	256,465	1.0
All remaining.....	761,380	483,352	280,974	253,066	427,203	1.7
Total.....	30,030,232	25,082,800	19,807,998	18,177,728	24,718,651	100.0

Twenty-three nationalities were represented in the commercial traffic passing through the Canal in 1934, compared with 21 in 1933 and 22 in 1932. Vessels of United States registry led in the num-

ber of transits, as has been the case during the preceding 15 years. From 1915 to 1918, inclusive, transits of British vessels exceeded those of any other country. In all years of operation either British or United States vessels have led in transits. Vessels of the leading nationalities all carried more cargo than in 1933.

FOREIGN NAVAL VESSELS

The preceding tables of commercial traffic include foreign military or naval vessels which paid tolls; but the tonnage of the vessels which pay on the basis of displacement tonnage (i. e., those other than transports, colliers, hospital ships, and supply ships) is not included in the figures for tonnage. All of the foreign naval vessels which passed through the Canal during the fiscal year 1934 paid tolls on the basis of displacement tonnage; their traffic is summarized as follows:

Nationality	Number of vessels	Displacement tonnage	Tolls
British.....	8	35,508	\$17,754.00 ^b
German.....	1	6,490	3,245.00 ^b
Mexican.....	1	1,227	613.50 ^b
Peruvian.....	7	9,742	4,871.00 ^b
Spanish.....	1	3,297	1,648.50 ^b
Total.....	18	56,264	28,132.00 ^b

VESSELS ENTITLED TO FREE TRANSIT

Naval and other vessels owned and operated in the Government service of the United States and Panama, war vessels of Colombia, and vessels transiting solely for repairs at the Balboa shops, are exempt from the payment of tolls, and such vessels are not included in the general transit statistics in this section.

The following shows the vessels of each group, the amount of tolls to which they would have been subject at the prescribed rates if tolls were charged against them, and the cargo carried by such vessels in ocean-to-ocean movement.

Class	Transits	Panama Canal net tonnage	Displace- ment	Tolls	Cargo
U. S. Navy.....	394	370,321	923,641	\$811,196.37	157,173-
U. S. Army.....	83	251,376	33,450	253,822.50	21,972
Other U. S. Government vessels.....	2	-----	1,408	704.00	-----
Total.....	484	621,697	958,499	1,065,722.87	179,145
Government of Colombia.....	2	-----	2,660	1,330.00	-----
Solely for repairs.....	15	40,594	-----	28,162.77	13,050
Byrd expedition.....	2	5,089	-----	4,747.50	-----
Total.....	503	667,380	961,159	1,099,963.14	192,195

LAUNCHES

Launches of less than 20 tons measurement (Panama Canal net) are also excluded from the statistics of commercial traffic, although they are not exempt from the payment of tolls. The following summarizes the traffic of such launches during the fiscal year 1934:

	Transits	Panama Canal net	Tolls	Cargo (tons)
Atlantic to Pacific.....	104	1,110	\$1,051.93	134
Pacific to Atlantic.....	71	742	861.64	935
Total.....	175	1,852	1,913.57	1,069

TRADE ROUTES AND CARGO

Cargo shipments through the Panama Canal during the fiscal year 1934 and in the 3 preceding years, segregated by principal trade routes, are shown in the following table:

	Tons of cargo			
	1931	1932	1933	1934
United States intercoastal:				
Atlantic to Pacific.....	2,379,751	1,917,052	1,595,087	2,074,707
Pacific to Atlantic.....	6,425,624	4,705,932	4,831,521	6,850,261
Total.....	8,805,375	6,622,984	6,426,608	8,924,968
United States and Far East (including Philippine Islands):				
Atlantic to Pacific.....	1,360,772	1,714,725	1,323,003	1,822,955
Pacific to Atlantic.....	862,053	851,124	1,077,734	1,535,733
Total.....	2,222,825	2,565,849	2,400,737	3,358,688
Europe and South America:				
Atlantic to Pacific.....	503,566	206,908	164,695	212,213
Pacific to Atlantic.....	1,804,191	1,532,204	1,368,234	2,433,350
Total.....	2,307,757	1,739,112	1,532,929	2,645,563
Europe and Canada:				
Atlantic to Pacific.....	124,605	69,926	70,573	85,153
Pacific to Atlantic.....	1,901,810	2,109,790	2,788,173	2,010,898
Total.....	2,026,415	2,179,716	2,858,746	2,096,051
Europe and United States:				
Atlantic to Pacific.....	425,343	334,160	249,966	320,366
Pacific to Atlantic.....	2,729,347	1,834,090	1,700,808	1,530,881
Total.....	3,154,690	2,168,250	1,950,774	1,851,247
East Coast United States and West Coast South America:				
Atlantic to Pacific.....	252,363	116,638	44,474	108,447
Pacific to Atlantic.....	2,105,298	1,001,749	294,076	1,633,499
Total.....	2,357,661	1,118,387	338,550	1,741,946
Europe and Australasia:				
Atlantic to Pacific.....	441,470	286,740	235,075	252,680
Pacific to Atlantic.....	671,843	422,227	295,896	600,931
Total.....	1,113,313	708,967	530,971	853,611
United States and Hawaiian Islands:				
Atlantic to Pacific.....	124,755	127,576	63,798	114,227
Pacific to Atlantic.....	135,478	395,843	349,938	381,131
Total.....	260,233	523,419	413,736	495,358

	Tons of cargo			
	1931	1932	1933	1934
United States and Australasia:				
Atlantic to Pacific.....	202,311	187,393	164,215	211,018
Pacific to Atlantic.....	166,648	81,501	18,552	81,303
Total.....	368,959	268,894	182,767	292,321
Miscellaneous routes and sailings:				
Atlantic to Pacific.....	865,493	674,240	601,003	365,562
Pacific to Atlantic.....	1,600,079	1,238,180	940,907	1,493,336
Total.....	2,465,572	1,912,420	1,541,910	2,458,898
Total traffic, all routes:				
Atlantic to Pacific.....	6,680,429	5,635,358	4,511,889	6,167,328
Pacific to Atlantic.....	18,402,371	14,172,640	13,665,839	18,551,323
Total.....	25,082,800	19,807,998	18,177,728	24,718,651

The preponderant movements of cargo through the Canal in 1934 were to or from the two coasts of North America, as in previous years. In the traffic from the Atlantic to the Pacific approximately 80 percent of the cargo originated on the east coast of North America, and about 47 percent of all cargo going through to the Pacific was destined to the west coast of North America. Of the traffic in the opposite direction, about 62 percent of the total came from the west coast of the continent, and about 62 percent of all cargo from the Pacific through the Canal was destined to the east coast of North America.

Of the total cargo of 24,718,651 tons passing through the Canal in the past fiscal year, 6,167,328 tons, or 25 percent, were routed from the Atlantic to the Pacific, and 18,551,323 tons, or 75 percent, from the Pacific to the Atlantic. In comparison with the previous fiscal year, total cargo tonnage registered an increase of 6,540,923 tons, or 36 percent; the Atlantic to Pacific movement made an increase of 1,655,439 tons, or 36.7 percent, while in the opposite direction the increase was 4,885,484 tons, or 35.7 percent.

Of the principal trade routes listed above, 7 showed increases in comparison with the previous year and 2 decreases (Europe and United States, and Europe and Canada). Both of these routes made gains in the Atlantic to Pacific movement but not sufficient to offset the losses in the opposite direction. The routes showing the largest gains were United States intercoastal, and east coast of the United States and west coast of South America, which increased 38.9 percent and 414 percent respectively. The resumption of iron-ore and nitrate shipments accounts for the large increase in the last-named route.

ORIGIN AND DESTINATION OF CARGO

The trade areas of origin of cargo, with the destination of the corresponding cargo, are shown in the following tables; one covers the movement from Atlantic to Pacific, the other that from the Pacific to the Atlantic.

Origin and destination of cargo through the Panama Canal during 1934, from Atlantic to Pacific, segregated by countries in principal trade areas

From—	To west coast, North America						To west coast, South America					
	United States	Canada	Central America	Balboa ¹	Hawaiian Islands	Total	Chile	Colombia	Ecuador	Peru	South America ²	Total
East coast, North America:												
United States:	1,489,166	4,205	11,315	8,959	108,403	1,622,078	49,879	15,558	4,994	28,892	6,428	105,751
North Atlantic ports:	51,119			5474	51,563	555,888		2,696				2,696
South Atlantic ports:	534,392	12,259		3,887	5,350							
Gulf ports:												
Total, United States:	2,074,707	16,464	11,315	12,846	114,227	2,229,559	49,879	18,254	4,994	28,892	6,428	108,447
Canada:	22,127	56,066	22,368	24	78,219	2,000	4,551	30	150	...	...	6,731
Central America and Mexico:	104		189	40,878	22,496	8,230				28		8,258
Cristobal, Canal Zone ¹ :	6,816		41	18,862	47,924	10,606	20,821	17,124	19,859	2,540		79,951
West Indies:	21,951	23,320	14,284	1	78,408	15,519	4,093	6,256	19			25,887
Total, North America:	2,125,705	96,039	93,413	27,221	114,228	2,456,606	95,234	47,719	28,404	48,948	8,968	229,273
Europe:												
British Isles:	51,195	63,907	5,386	11	1,527	120,499	32,575	2,600	3,853	23,696	2,925	65,649
Belgium:	86,224	4,628	6,227	85		98,691	18,848	1,090	2,294	9,911	3,373	35,525
Denmark:	1,731	10	6,002		7,733	7,730	1,254	1,254	1,254	1,254	1,254	11,095
France:	11,767	629	905	13	13	4,969	25	70	1,570			6,729
Germany:	68,580	3,784	10,633	428	5,931	88,776	12,457	5,166	4,233	13,162	3,068	38,076
Italy:	9,992	6,688	3,371	7	135	4,346	1		1,309	64		5,720
Netherlands:	11,712	2,624			135	14,471	5,670	689	691	3,389		11,038
Norway:	27,283	121	10,219	8,397	1,504	47,524	4,428	4,771	6,924	2,319	4,235	22,677
Spain and Portugal:	2,859	6,172	161	87		9,279	688			329	152	1,169
Sweden:	40,919	1,057	3,865	400	3,34	46,275	3,306	98		466	3,290	7,429
Europe ¹ :	8,104	533	2,232		7,131	18,000	3,363	28	134	3,386	6,195	7,106
Total, Europe:	320,366	85,153	48,421	9,574	16,134	479,648	87,650	24,247	19,919	59,412	20,965	212,213
East coast, South America:	102,222	8,035	9	383	17	110,666	59,954	4,274	42	1,580	92	65,942
Asia:	917			82		999						
Africa (other than Egypt):	8			86								
Egypt:	52					94						
Grand total:	2,549,270	189,227	141,843	37,346	130,379	3,048,065	242,838	76,260	48,365	109,940	30,025	507,428
Percent of total cargo:	41.4	3.1	2.3	0.6	2.1	49.5	3.9	1.2	0.8	1.8	0.5	8.2

¹ Includes both local and transit cargo.² General cargo not routed as to allow segregation between definite countries.

Origin and destination of cargo through the Panama Canal during 1934, from Atlantic to Pacific, segregated by countries in principal trade areas—Continued

From—	To Australasia				To Asia				Grand total	Percent- age of total cargo
	Australia	New Zea- land	Austral- asia ⁴	Total	Philippine Islands	China	Japan	Far East	Total	
East coast, North America:										
United States:										
North Atlantic ports	96,651	41,403	1,037	139,091	138,356	181,721	493,006	19,180	832,263	2,699,183
South Atlantic ports	3,711	477	7,000	4,188	6,160	11,156	84,951	532	99,799	155,380
Gulf ports	41,165	19,574		67,739	4,314	94,403	759,645	32,531	890,893	1,517,216
Total, United States	141,527	61,451	8,037	211,018	148,830	287,280	1,334,602	52,243	1,822,955	4,371,979
Canada	58,049	23,236	2,982	84,317	63	4,675	22,107	92	26,937	196,204
Central America	13,444	2,934		16,378			950		950	48,082
Cristobal ¹	132			165			1,302		1,302	129,311
West Indies	2,208	\$,100		10,308	2		39,124		39,124	233,311
Total, North America	215,410	95,724	11,052	322,186	148,805	371,767	1,398,085	52,335	1,971,082	4,979,147
Europe:										
British Isles	224,199	16,697		240,896		14,165	21,505		35,760	427,044
Belgium				2,750	2,750					169,976
Denmark				9,034	9,034					21,688
France										29,677
Germany										126,912
Italy										20,796
Netherlands										25,509
Norway										70,201
Spain and Portugal										18,518
Sweden										53,704
Europe ²										25,106
Total, Europe	224,199	28,491		282,680	21	11,204	29,635		43,920	988,461
East coast, South America						3	20,693	450	21,116	187,751
Asia										999
Africa (other than Egypt)				821	821					915
Egypt										52
Grand total	215,410	319,923	40,354	575,687	148,916	385,974	1,448,473	52,785	2,036,148	6,107,328
Percentage of total cargo	3.5	5.2	0.6		2.4	6.3	23.5	0.8	33.0	100.0

¹ Includes both local and transit cargo.

² General cargo not routed so as to allow segregation between defined countries.

Origin and destination of cargo through the Panama Canal during 1934, from Pacific to Atlantic, segregated by countries in principal trade areas

From—	To United States				To other North America				To Europe		
	North Atlantic ports	South Atlantic ports	Gulf ports	Total	Canada	Central America and Mexico	Cristobal, Canal Zone	West Indies	British Isles	Belgium	Denmark
West coast, North America:											
United States	6,146,957	299,743	403,561	6,850,261	1,785	4,300	64,284	168,089	7,088,719	748,112	54,326
Canada	30,708	16,791	47,499	50,453	1,447	2,150	48,144	149,633	1,568,708	75,249	19,886
Central America	13,869	20,535	34,404	50	242	31,041	4,302	69,989	2,328	1,333	252
Balboa, Canal Zone ¹	318,697	804	360	381,131	3,797	3,797	21	381,159	15,003	—	21
Hawaiian Islands	—	—	—	—	—	—	—	—	—	—	—
Total, North America	6,510,231	300,547	502,877	7,313,655	.52,238	5,989	101,279	220,556	7,693,717	2,334,151	130,908
West coast, South America:											
Chile	1,179,981	195,869	55,729	1,431,579	—	31	10,155	11,281	1,453,046	155,200	67,138
Colombia	17,816	120	—	17,936	—	—	49,168	—	67,104	147	184
Ecuador	62,859	—	3,634	66,433	—	—	44,565	655	11,733	395	20,900
Peru	97,557	8,100	6,000	111,657	403,898	11	1,960	4,102	521,628	475,905	38,408
South America ²	5,834	—	—	5,834	—	—	762	29	6,625	239	—
Total, South America	1,364,047	204,089	65,363	1,633,499	403,898	42	106,610	16,067	2,160,116	631,886	126,690
Australasia:											
Australia	33,690	—	—	33,690	34,038	—	255	—	68,033	5,926	2,800
New Zealand	15,398	—	—	15,398	7,513	—	653	—	23,854	469,761	—
Australasia ²	32,215	—	—	32,215	969	—	—	290	33,206	56,424	—
Total, Australasia	81,303	—	—	81,303	42,570	—	908	312	125,093	532,111	2,800
Asia:											
Philippine Islands	976,626	217,761	1,194,387	—	—	—	62	31	1,194,480	—	—
China	61,220	369	61,589	—	—	—	5,213	664	67,466	16,619	—
Japan	204,084	31,233	12,016	247,333	—	—	13,563	5,152	266,078	33,738	11,602
Far East ¹	19,622	446	12,356	32,424	—	—	1,160	219	—	—	7,480
Total, Asia	1,261,552	32,048	242,133	1,535,733	—	—	20,018	6,066	1,561,817	28,221	—
Grand total	9,217,133	536,684	810,273	10,564,190	498,706	56,9	228,815	243,001	11,549,743	3,526,369	260,398
Percentage of total cargo	49.7	2.9	4.3	56.9	2.7	—	1.2	1.4	62.2	19.0	0.4

¹ Includes both local and transit cargo.² General cargo not routed so as to allow segregation between definite countries.

Origin and destination of cargo through the Panama Canal during 1934, from Pacific to Atlantic, segregated by countries in principal trade areas—Continued

From—	To Europe						To—			Grand total Africa ³	Percent- age of total cargo			
	France	Ger- many	Italy	Nether- lands	Spain and Portugal	Sweden	Europe ²	Total	South America	Egypt	Far East			
West coast, North America:														
United States.....	94,903	188,895	14,631	108,766	19,431	20,600	17,664	239,924	1,530,881	43,208	9,401	16,237	8,688,446	
Canada.....	61,833	41,640	10,306	40,837	3,373	2,870	22,737	1,318	2,010,895	26,150	89	14,356	2,201,186	
Central America.....	5,906	19,705	1,506	1,506	.....	.....	3,011	1,318	60,966	125	.....	.....	13,080
Balboa, Canal Zone ¹.....	.....	.....	.....	33	.....	.....	53	.....	15,110	.....	.....	4,157	4,157
Hawaiian Islands.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	396,269	2,11
Total, North America.....	162,642	250,240	26,443	152,506	19,804	43,337	22,586	431,450	3,617,855	69,483	9,490	30,593	11,421,138	
West coast, South America:														
Chile.....	31,471	37,168	29,027	16,331	3,303	8,463	46,374	654,531	1,035,424	83	26,045	.....	2,534,598
Colombia.....	1,708	1,213	1,471	601	310	55	100	324	2,786	470	.....	70,360	13,6
Ecuador.....	75,213	.....	874	266	18,068	29,511	34	11,001	920	100,534	.....	212,247	1,4
Peru.....	390,113	12,421	206	48	.....	.....	.....	266,583	1,269,939	3,526	.....	1,786,113	9,6
South America ².....	.....	.....	.....	.....	.....	.....	.....	14,360	14,647	28	.....	21,300	2
Total South America.....	496,797	52,768	30,167	35,413	32,814	8,652	57,375	936,718	2,433,350	4,107	26,045	.....	4,623,618
Australasia:							*							
Australia.....	3,250	4,476	32,953	.....	.....	.....	.....	1,791	11,976	476,028	.....	80,009	.4
New Zealand.....	.....	.....	.....	.....	.....	.....	.....	22,910	112,927	.....	.....	498,882	2.7
Australasia ²	40,679	.....	.....	.....	640	.....	.....	640	24,701	600,931	.....	146,133	.8
Total Australasia.....	40,679	.....	.....	.....	640	.....	.....	640	24,701	600,931	.....	726,024	3.9
Asia:														
Philippine Islands.....	21,095	.....	8,008	.....	.....	.....	.....	80,751	126,473	6	.....	1,194,480	6.4
China.....	17,371	.....	.....	.....	.....	.....	.....	54,994	91,447	274	.....	193,945	1.1
Japan.....	38,466	8,008	135,745	217,920	400	406	266,352	1.4
Total Asia.....	700,118	341,474	56,610	195,927	52,618	.3	.3	52,629	79,961	1,528,614	.4	6,870,056	.7	
Grand total.....	3,8	1,8	.3	1,1	1,1	.....	.....	.....	73,990	26,045	.2	30,999	18,551,323
Percent of total cargo.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100,0	.....

¹ Includes both local and transit cargo.

² General cargo not routed so as to allow segregation between definite countries.

³ Other than Egypt.

PRINCIPAL COMMODITIES

Statistics of commodities passing through the Canal are not precise because it is not required that complete manifests of cargo carried by vessels be submitted at the Canal. In lieu of a manifest the master of each vessel is required to file a "cargo declaration", which is a briefly itemized statement, listing the principal items of cargo carried and showing their ports or country of origin and destination. These cargo declarations are the basis of the commodity statistics. There is a natural tendency not to list small miscellaneous shipments but to include them under the head of "General cargo"; not infrequently no other classification is made of the entire cargoes carried by vessels. Hence, except in the case of commodities commonly shipped in bulk, such as mineral oils carried in tank ships, wheat, lumber, nitrates, etc., shipments of various goods are likely to be in excess of the aggregate tonnage reported during the year and shown in the annual summary. Subject to errors arising from this source the tonnage of the principal commodities shipped through the Canal during the past 4 years is shown in the following table:

Commodity movement

Commodity	Fiscal year ended June 30—			
	1931	1932	1933	1934
ATLANTIC TO PACIFIC				
Manufactures of iron and steel.....	<i>Long tons</i> 1,230,091	<i>Long tons</i> 781,494	<i>Long tons</i> 502,503	<i>Long tons</i> 982,596
Mineral oils.....	485,520	518,498	407,492	550,469
Scrap metal.....	46,904	87,657	273,375	503,277
Cotton, raw.....	298,877	747,496	432,043	492,459
Paper.....	202,478	204,297	214,568	256,449
Tinplate.....	224,291	148,852	108,500	241,854
Sulphur.....	190,690	197,941	149,790	206,509
Phosphates.....	312,925	239,266	154,145	188,320
Coal and coke.....	122,179	95,199	85,548	110,294
Canned goods (fish, fruit, vegetables, etc.).....	100,311	117,857	101,751	106,869
Textiles.....	94,254	83,756	78,555	98,269
Automobiles (exclusive of accessories).....	104,002	66,673	50,731	90,111
Chemicals.....	66,690	72,436	64,072	87,652
Machinery.....	139,928	78,656	54,781	87,285
Cement.....	206,483	76,870	69,105	85,456
Sugar.....	87,436	58,671	40,256	75,770
Tobacco.....	116,946	65,806	67,548	72,006
Nitrates.....	26,522	36,980	45,295	69,164
Automobile accessories.....	51,768	39,367	35,237	65,217
Coffee.....	79,382	61,241	54,491	64,624
Asphalt and tar.....	74,962	60,286	47,748	61,581
Metals, various.....	59,106	42,830	30,662	60,140
Salt.....	56,002	36,855	30,263	60,018
Ammonium compounds.....	79,100	71,933	35,002	56,331
Glass and glassware.....	47,100	44,911	47,374	51,548
Sand.....	15,765	14,392	23,519	31,225
Railroad material.....	77,538	26,731	18,265	42,350
Corn.....	23,874	59,987	128,331	42,241
Wood pulp.....	22,319	23,397	38,986	38,497
Rosin.....	39,886	45,405	38,024	43,834
Soap.....	32,310	35,289	28,631	24,505
All other.....	1,879,714	1,459,807	1,188,646	1,195,162
Total.....	6,680,429	5,635,358	4,511,889	6,167,328

Commodity movement—Continued

Commodity	Fiscal year ended June 30—			
	1931	1932	1933	1934
PACIFIC TO ATLANTIC				
Mineral oils	4,524,338	3,116,844	3,506,356	5,443,271
Lumber	2,747,485	2,129,787	1,549,483	2,148,020
Sugar	1,033,013	1,298,830	1,667,496	1,773,137
Wheat	1,862,147	1,790,530	2,368,892	1,371,258
Ores ¹	1,436,792	618,368	90,518	1,224,135
Nitrate	1,375,460	811,522	186,783	1,059,425
Canned goods (fish, fruit, vegetables, etc.)	876,644	787,736	865,716	882,254
Metals, various	557,498	472,560	376,396	511,759
Food products in cold storage ²	384,526	248,874	162,143	357,058
Fruit, fresh	286,049	256,563	285,523	311,530
Fruit, dried	282,791	340,851	314,061	307,714
Flour	146,640	123,964	180,858	270,531
Soy beans			39,593	206,605
Barley	235,364	153,206	209,890	197,183
Wool	157,129	101,147	97,852	155,627
Coffee	149,215	125,228	152,735	140,907
Wood pulp	109,163	147,541	106,329	135,214
Beans	171,335	172,526	103,522	128,473
Paper	114,301	116,103	98,997	110,095
Copra	113,587	79,471	80,789	103,904
Coconut oil	76,971	83,631	54,213	101,942
Oats	92,812	108,089	79,898	90,034
Borax	70,913	75,463	66,205	80,512
Cotton, raw	95,622	62,005	64,931	78,018
Skins and hides	66,975	53,619	52,509	62,271
Rice	116,330	53,924	34,267	47,128
All other	1,000,211	826,753	849,789	1,253,318
Total	18,402,371	14,172,640	13,665,839	18,551,323

¹ Principally iron in 1931, 1932, and 1934.² Does not include fresh fruit.**CLASSIFICATION OF VESSELS****LADEN AND BALLAST TRAFFIC**

The following summarizes commercial traffic through the Canal during the fiscal year 1934 by laden ships and those in ballast, divided between tankers and general cargo vessels, and showing the ships not designed to carry cargo:

Classification	Atlantic to Pacific	Pacific to Atlantic	Total
Tank ships, laden:			
Number of transits	58	449	507
Panama Canal net tonnage	266,431	2,804,933	3,071,364
Tolls	\$280,245.85	\$2,907,844.85	\$3,188,090.70
Cargo (tons)	377,666	5,531,865	5,909,531
Tank ships, ballast:			
Number of transits	424	11	435
Panama Canal net tonnage	2,710,088	30,543	2,740,631
Tolls	\$1,951,690.56	\$22,006.14	\$1,973,696.70
General cargo ships, laden:			
Number of transits	1,795	2,131	3,926
Panama Canal net tonnage	9,654,676	10,557,723	20,212,399
Tolls	\$8,024,882.15	\$9,018,964.20	\$17,043,846.35
Cargo (tons)	5,789,662	13,019,458	18,809,120
General cargo ships, ballast:			
Number of transits	602	12	614
Panama Canal net tonnage	2,433,220	14,599	2,447,819
Tolls	\$1,745,767.22	\$10,522.08	\$1,756,289.30

Classification	Atlantic to Pacific	Pacific to Atlantic	Total
Non-cargo-carrying ships:			
Yachts:			
Number of transits.....	13	9	22
Panama Canal net tonnage.....	4,253	4,226	8,479
Tolls.....	\$3,073.83	\$3,082.80	\$6,156.63
Naval vessels:			
Number of transits.....	9	9	18
Displacement tonnage.....	25,945	30,319	56,264
Tolls.....	\$12,972.50	\$15,159.50	\$28,132.00
Tugs:			
Number of transits.....	3		3
Panama Canal net tonnage.....	287		287
Tolls.....	\$354.00		\$354.00
Icebreakers:			
Number of transits.....	1		1
Panama Canal net tonnage.....	1,327		1,327
Tolls.....	\$1,782.75		\$1,782.75
Dredges:			
Number of transits.....		1	1
Panama Canal net tonnage.....		1,491	1,491
Tolls.....		\$1,073.52	\$1,073.52
Cruise vessels:			
Number of transits.....	3	3	6
Panama Canal net tonnage.....	31,589	51,209	82,798
Tolls.....	\$26,315.00	\$38,052.50	\$64,367.50
SUMMARY			
→Total cargo ships, laden:			
Number of transits.....	1,853	2,580	4,433
Panama Canal net tonnage.....	9,921,107	13,362,656	23,283,763
Tolls.....	\$8,305,128.00	\$11,926,809.05	\$20,231,937.05
Cargo (tons).....	6,167,328	18,551,323	24,718,651
Total cargo ships, ballast:			
Number of transits.....	1,026	23	1,049
Panama Canal net tonnage.....	5,143,308	45,142	5,188,450
Tolls.....	\$3,697,457.75	\$32,528.22	\$3,729,986.00
Total tank ships:			
Number of transits.....	482	460	942
Panama Canal net tonnage.....	2,976,519	2,835,476	5,811,995
Tolls.....	\$2,231,936.41	\$2,929,850.99	\$5,161,757.40
Cargo (tons).....	377,666	5,531,865	5,909,531
Total general cargo ships:			
Number of transits.....	2,397	2,143	4,540
Panama Canal net tonnage.....	12,087,896	10,572,322	22,660,218
Tolls.....	\$9,770,649.37	\$9,029,486.28	\$18,800,135.65
Cargo (tons).....	5,789,662	13,019,458	18,809,120
Total non-cargo-carrying ships:			
Number of transits.....	29	22	51
Panama Canal net tonnage.....	37,456	56,926	94,382
Displacement tonnage.....	25,945	30,319	56,264
Tolls.....	\$44,498.08	\$57,368.32	\$101,866.40
Grand totals:			
Number of transits.....	2,908	2,625	5,533
Panama Canal net tonnage.....	15,101,871	13,464,724	28,566,595
Displacement tonnage.....	25,945	30,319	56,264
Tolls.....	\$12,047,053.86	\$12,016,705.59	\$24,063,759.45
Cargo (tons).....	6,167,328	18,551,323	24,718,651

AVERAGE TONNAGE, TOLLS, AND TONS OF CARGO PER CARGO-CARRYING VESSELS

The average measurement tonnage, tolls, and tons of cargo per cargo-carrying vessels transiting the Canal during the past 3 years are shown in the following tabulation:

	Fiscal year 1932	Fiscal year 1933	Fiscal year 1934
Measured tonnage:			
Panama Canal net.....	5,298	5,139	5,194
United States net tonnage.....	3,858	3,686	3,700
Registered gross tonnage.....	6,449	6,121	6,244
Registered net tonnage.....	3,898	3,724	3,733
Tolls.....	\$4,638.97	\$4,413.43	\$4,371.02
Tons of cargo (including vessels in ballast).....	4,445	4,096	4,509
Tons of cargo (laden vessels only).....	5,154	4,912	5,576

NOTE.—Computations of above averages based on cargo-carrying vessels only; craft not engaged in commerce, such as yachts, naval vessels, etc., are not considered.

The increase in the average net tonnage, Panama Canal measurement, of vessels transiting in 1934 in comparison with 1933 was 1.1 percent. The average of United States equivalent net tonnage per vessel increased 0.3 percent.

The average cargo per vessel transiting (including in the total the vessels which made the transit in ballast) increased from 4,096 tons in 1933 to 4,509 tons in 1934, or 10 percent.

Laden vessels only carried on an average of 4,912 tons in 1933 and 5,576 tons in 1934, an increase of 13.5 percent.

STEAM, MOTOR, AND OTHER VESSELS

Of the 5,533 commercial vessels transiting the Canal during the fiscal year, 3,489 were steamers, 1,790 were motorships, and the remainder, 253, were chiefly motor schooners. For the past 5 years the proportions of these classes have been as follows:

	1930	1931	1932	1933	1934
	Percent	Percent	Percent	Percent	Percent
Steamers.....	76.8	71.1	66.3	60.0	63.1
Motor ships.....	22.8	28.4	32.1	34.0	32.4
Miscellaneous.....	.4	.5	1.6	6.0	4.5
Total.....	100.0	100.0	100.0	100.0	100.0

Of the 3,489 steamers transiting the Canal during the past fiscal year, 2,659 burned oil, 790 burned coal, and 40 were reported as fitted for either fuel. For the past 5 years the proportions of each class have been as follows:

	1930	1931	1932	1933	1934
	Percent	Percent	Percent	Percent	Percent
Oil burning.....	72.2	72.8	76.1	70.6	76.2
Coal burning.....	26.4	25.6	22.1	27.2	22.6
Either oil or coal.....	1.4	1.6	1.8	2.2	1.2
Total.....	100.0	100.0	100.0	100.0	100.0

SUMMARY OF PASSENGER MOVEMENT AT THE CANAL DURING 1934

The following tabulation shows by months the number of passengers disembarking and embarking at Canal Zone ports during the fiscal year 1934, segregated as between first-class and "others", with comparative totals for the fiscal years 1933 and 1932:

Month	Disembarking			Embarking		
	First-class	Others	Total	First-class	Others	Total
July.....	1,454	749	2,203	1,843	1,035	2,878
August.....	1,485	608	2,093	1,658	1,246	2,904
September.....	1,659	1,122	2,781	1,210	692	1,902
October.....	1,334	644	1,978	1,182	936	2,118
November.....	1,329	871	2,200	1,059	813	1,872
December.....	1,306	635	1,941	1,245	1,102	2,347
January.....	1,316	616	1,932	1,049	669	1,718
February.....	1,286	1,347	2,633	1,293	1,017	2,310
March.....	1,333	851	2,184	1,288	1,389	2,677
April.....	1,334	1,809	3,143	1,315	1,596	2,911
May.....	1,163	1,448	2,611	1,784	1,502	3,286
June.....	1,647	1,482	3,129	1,537	1,512	3,049
Total, 1934.....	16,646	12,182	28,828	16,463	13,509	29,972
Total, 1933.....	14,153	11,859	26,012	14,445	13,869	28,314
Total, 1932.....	17,776	14,703	32,479	16,803	13,689	30,492

As compared with 1933, the fiscal year 1934 shows a 10.8-percent increase in the number of arrivals, and in comparison with 1932 a 11.2-percent decrease; in the number of departures there was an increase of 14 percent over 1933 and a decrease of 2 percent under 1932.

The following table shows the passenger traffic through Cristobal and through Balboa in the past 3 years, and it is seen that about 68 percent of it has been through Cristobal:

	Port of Cristobal			Port of Balboa		
	1932	1933	1934	1932	1933	1934
Passengers disembarking.....	22,658	17,583	18,898	9,821	8,429	9,930
Passengers embarking.....	22,147	19,444	19,156	8,345	8,870	10,816

A further segregation of the passenger movement shows that 19,983 incoming and 19,940 outgoing passengers were brought from or were destined to ports of the Atlantic, and 8,845 incoming and 10,032 outgoing passengers were brought from or were destined to ports on the Pacific.

Transient passengers.—In addition to the figures shown above of passengers disembarking and embarking, there were 101,934 transient passengers brought to the Isthmus by vessels calling at Canal ports during the fiscal year 1934. For the fiscal year 1933, this number was 95,628, and in the fiscal year 1932, 91,844. The number in

1934 increased 6,306, or 6.6 percent, in comparison with those in 1933, and in comparison with 1932 an increase of 10,090, or 11 percent. Most of these passengers came ashore for a short period but as they departed on the vessel on which they arrived they are not included in the tabulation of passengers ending or beginning a voyage at the Isthmus. The origin and destination of these transient passengers are indicated in the following tabulation:

	Total		Fiscal year 1934		
	1932	1933	Cristobal	Balboa	Total
Remaining on board vessels transiting Canal:					
Atlantic to Pacific-----	35,924	38,963	38,114		38,114
Pacific to Atlantic-----	31,392	29,873		31,390	31,390
Remaining on board vessels entering port, but not transiting Canal:					
Atlantic to Atlantic ports-----	23,528	25,510	30,804		30,804
Pacific to Pacific ports-----	1,000	1,282		1,626	1,626
Total-----	91,844	95,628	68,918	33,016	101,934

NOTE.—In passengers "remaining on board vessels transiting Canal", those from the Atlantic to the Pacific are taken up at Cristobal, and those from the Pacific to the Atlantic at Balboa, i. e., at the port of arrival from sea, and not again at the other terminus of the Canal.

Included among the transient passengers were a number visiting the Canal as members of tourist cruises, many of whom crossed the Isthmus in sight-seeing parties by special train in connection with a boat trip through Gaillard Cut. During the past year 72 boat trips were made, carrying 9,458 passengers.

FREQUENCIES OF TRANSITS OF VESSELS THROUGH THE PANAMA CANAL

During the fiscal year 1934, 1,385 individual commercial vessels, representing 23 nationalities, passed through the Panama Canal in the total of 5,533 transits. The number of transits by individual ships varied from 1 to 80, and averaged 3.99. The 80 transits were made by the small Panamanian motor schooner *Real* of 22 net tons, Panama Canal measurement. This vessel was engaged in carrying bananas from the Pacific coast of the Republic of Panama to Cristobal. The number of vessels making only one transit during the year was 331.

Although vessels of United States registry led in the aggregate number of transits during the year, Great Britain, which ranked second in transits, led in the number of individual vessels, with 460. The individual vessels of United States registry which passed through during the year numbered 412.

The following table shows the number of individual ships, the frequency of transits per vessel, the total transits for the year, and the average number of transits per individual vessel, segregated by nationality:

Vessels making indicated number of transits per vessel during fiscal year 1934

Nationality	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28	29	31	32	34	36	54	80	Total ships	Total transits	Average number of transi- ts
British.....	150	153	43	50	25	24	8	3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	460	1,208	2.63	
Chilean.....	1	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	7	2.33		
Colombian.....	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1.00		
Danish.....	14	12	2	5	5	4	2	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	45	135	3.00		
Danzig.....	2	—	3	—	4	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12	70	5.33		
Finnish.....	1	1	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	7	2.33		
French.....	7	9	1	5	4	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30	92	3.07		
German.....	8	13	9	9	3	4	6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	56	301	5.33		
Greek.....	1	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5	13	2.60		
Honduran.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	9.00		
Italian.....	4	4	—	1	4	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17	68	4.00		
Japanese.....	16	25	11	15	4	12	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	84	258	3.07			
Mexican.....	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1.00		
Netherland.....	5	5	—	—	1	2	8	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	23	91	3.96		
Norwegian.....	51	20	22	19	10	5	7	4	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	144	450	3.13			
Panamanian.....	4	1	3	—	3	3	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	383	15.32		
Peruvian.....	9	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	14	1.27		
Russian.....	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	3	1.00		
Spanish.....	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	1.00		
Swedish.....	10	8	2	2	1	3	3	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31	122	3.94		
United States.....	34	79	33	44	33	48	37	29	24	12	7	11	8	1	3	4	4	1	—	—	—	—	—	—	—	—	—	—	—	—	—	412	2,269	5.51			
Venezuelan.....	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	3	1.24		
Yugoslav.....	10	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18	1.29			
Total.....	331	343	127	156	94	122	65	42	30	16	7	14	8	2	3	4	4	1	2	1	1	2	1	1	1	1	1	1	1	1	1	1,335	5,533	3.99			

From the foregoing table it will be noted that 331, or 23.9 percent, of the total individual vessels using the Canal during the year made only one transit. Fifty-one and three-tenths percent of the vessels made 3 transits or more, and 5.4 percent made 10 or more transits.

The following tabulation shows for the fiscal year 1934 the number of vessels making the indicated number of transits through the Panama Canal, the percent which each class formed of the total number of individual vessels (1,385), their aggregate number of transits, and their percent of the total commercial transits (5,533) :

Number of transits	Number of vessels	Percent of individual vessels (1,385)	Total number of transits	Percent of total Canal transits (5,533)	Number of transits	Number of vessels	Percent of individual vessels (1,385)	Total number of transits	Percent of total Canal transits (5,533)
1	331	23.90	331	5.98	18	1	0.07	18	0.33
2	343	24.77	656	12.40	19	2	.14	38	.69
3	127	9.17	381	6.88	22	1	.07	22	.40
4	156	11.27	624	11.28	24	1	.07	24	.43
5	94	6.79	470	8.48	25	1	.07	25	.45
6	122	8.81	732	13.23	29	2	.14	52	.94
7	65	4.70	455	8.22	28	1	.07	28	.51
8	42	3.03	336	6.07	29	1	.07	29	.53
9	30	2.17	270	4.88	31	2	.14	62	1.12
10	16	1.16	160	2.89	32	1	.07	32	.58
11	7	.51	77	1.39	34	1	.07	34	.61
12	14	1.01	168	3.04	36	1	.07	36	.65
13	8	.58	104	1.88	54	1	.07	54	.98
14	2	.14	28	.51	80	1	.07	80	1.45
15	3	.22	45	.81					
16	4	.29	64	1.16	Total.....	1,385	100.00	5,533	100.00
17	4	.29	68	1.23					

NET TONNAGE OF VESSELS

The 5,533 commercial vessels which transited the Canal in the fiscal year 1934 were comprised of 5,515 merchant vessels, yachts, etc., paying on the basis of net tonnage, and 18 naval vessels paying tolls on the basis of displacement tonnage. Of the 5,515 commercial transits paying tolls on net tonnage, 52.4 percent were of vessels of from 4,000 to 6,000 net tons, Panama Canal measurement. Vessels under 1,000 net tons equaled 8.8 percent of the transits, and 3.2 percent were by vessels over 10,000 net tons. The average tonnage of all transits was 5,180 net tons as compared with 5,091 in the previous fiscal year, an increase of 81 tons, or 1.2 percent.

Vessels of Danzig registry (all tank ships) averaged the highest net tonnage, at 7,987; those of Italian registry were second, with 7,036; and those of Netherlands registry were third, with 5,883. The lowest recorded average by nationality was for ships of Honduras, with 48 net tons, and the next lowest was for Colombian vessels, with 307.

The following tabulation shows the commercial transits, excluding naval vessels, in groups according to net tonnage, Panama Canal measurement, segregated by nationality, with average tonnages and group percentages for the fiscal years 1934 and 1933:

Number of transits in net tonnage groups

Nationality	20 to 99 inclusive	100 to 999 inclusive	1,000 to 2,000 inclusive	2,000 to 3,999 inclusive	3,000 to 4,999 inclusive	4,000 to 5,000 inclusive	5,000 to 5,999 inclusive	6,000 to 6,999 inclusive	7,000 to 7,999 inclusive	8,000 to 8,999 inclusive	9,000 to 9,999 inclusive	10,000 and over	Total ¹	Panama Canal net tonnage	Average Panama Canal net tonnage	
Bololian	7	56	8	15	39	388	290	137	96	72	42	50	1,200	6,831,307	5,550	
Brazilian		1			3	4							7	5,633	3,636	
Chilean				20	12	6	45	25	3	2	21			26,680	3,815	
Danish													1	307	-----	
Danzig			1										135	636,831	4,717	
Finnish								2	2	20	48		70	539,101	4,695	
French			1					4					7	7,987	7,808	
German		3	1		5	32	19			28	4		7	31,811	3,320	
Greek		62	69	6	28	22	36		58	13	5		92	508,487	5,544	
Honduran				4	9								1		-----	
Italian		9											1		-----	
Japanese													13	54,026	4,156	
Netherland													9		-----	
Norwegian													13	54,026	4,156	
Panamanian		13	3	2	24	50	152	4	16	21	4		68	478,429	482	
Peruvian		201	101	28	33	2	123	2	18	29	16		13	7,036	7,594	
Russian			1	4									7	287,187	5,436	
Swedish			2					2					3	17,823	336	
United States		4	10	20	79	4	8	65	36	3			3	1,550	997	
Venezuelan		8	4				45	722	673	385	92		122	569,435	4,812	
Yugoslav													127	2,269	5,829	
Total	222	264	158	173	200	1,559	1,327	795	291	215	133	178	5,515	28,566,595	5,091	
Percent of total:																
1934	4.0	4.8	2.9	3.1	3.6	28.3	24.1	14.4	5.3	3.9	2.4		3.2	100.0	-----	
1933	5.3	6.4	3.0	2.4	3.7	25.5	24.6	15.6	4.8	3.6	1.9		3.2	100.0	-----	

¹ Eighteen naval vessels (8 British, 1 German, 1 Mexican, 7 Peruvian, and 1 Spanish) paying tolls on displacement tonnage, are not included.

DUAL MEASUREMENT SYSTEM

Under the existing law, tolls on commercial vessels using the Canal are levied on the basis of \$1.20 per net ton, on tonnage as determined under the Panama Canal rules of measurement, for laden ships, and \$0.72 per net ton, measured under the Canal rules, for ships in ballast, with the limitation that the amount collectible shall not exceed \$1.25 per net ton nor be less than \$0.75 per net ton as determined under the rules of measurement for registry in the United States.

The Panama Canal rules of measurement determine the net tonnage as the interior spaces of actual earning capacity, in tons of 100 cubic feet. The United States rules for measurement for registry exempt from inclusion in the net tonnage many spaces which have actual earning capacity. The result of this is that tolls on laden vessels transiting the Canal are usually paid on the basis of \$1.25 times the United States net tonnage, and tolls on ballast vessels are generally \$0.72 times the Panama Canal net tonnage. In rare cases the product of \$1.20 times the Canal net is slightly less than \$1.25 times the United States net, and tolls are paid on the Canal basis. There are other and more frequent cases of ships in ballast in which the Panama Canal net tonnage times \$0.72 is in excess of \$1.25 times the United States net, in which case the latter figure is the amount collectible; such vessels pay less than \$0.72 per net ton, Canal measurement, for transit either in ballast or laden. On small vessels such as tugs, the United States measurement sometimes indicates negative net tonnage, and such vessels make the transit without payment of tolls.

Registry rules were not designed as a suitable basis for the collection of Canal tolls and their application to the Panama Canal tolls has resulted in misunderstandings, inequalities, injustices, and depriving the Government of proper revenue. The Canal administration has recommended the use of the Canal rules only and, in order that approximately the same general level of tolls may be charged as under the present system, has recommended that if the Canal rules alone be used the rates should be set at approximately \$1 per net ton for laden vessels and 60 percent of such rate, or 60 cents, for vessels in ballast, and the Secretary of War indicated in 1934 that he would recommend a rate of 90 cents on laden ships; ballast vessels 60 percent less.

When the suggestion of a rate of \$1 per Canal net ton was first made it would have meant a slight decrease in the tolls collected. In later years, however, due to the reduction of the net tonnage of the vessels as measured under the United States registry rules, adoption of the proposed Canal rules and rates would have meant an increase in the total tolls. Some vessels would pay more, some less than at present, in proportion to the undercharges or overcharges under the

present dual system. The opposition of operators of vessels which would pay more has prevented the passage of corrective legislation. The need for such legislation is discussed further in section III, under Administrative Problems.

The following is a comparison of the increase in the tolls which would have been paid by the United States vessels and by all vessels other than those of United States registry in the past 8 fiscal years, if tolls had been levied on Canal net tonnage at \$1 per ton for laden ships and 60 cents for ships in ballast.

UNITED STATES VESSELS ONLY

Fiscal year	Tolls actually collected	Tolls which would have been collected on proposed basis	Increase	
			Actual	Percent
1927	\$12,720,447.95	\$12,601,622.60	¹ \$118,825.35	1 0.93
1928	12,645,880.20	12,662,378.60	16,498.40	.13
1929	12,299,584.70	12,471,487.00	171,902.30	1.40
1930	13,220,662.70	13,537,324.60	316,661.90	2.40
1931	11,425,999.31	11,883,318.60	457,319.29	4.00
1932	9,749,018.51	10,411,572.20	662,553.69	6.80
1933	8,933,850.79	9,670,737.20	736,886.41	8.25
1934	11,186,953.53	12,368,916.40	1,181,962.87	10.57

ALL VESSELS OTHER THAN UNITED STATES

1927	\$11,508,382.16	\$11,720,617.30	\$212,235.14	1.84
1928	14,298,619.57	14,583,094.40	284,474.83	1.99
1929	14,827,792.21	15,518,947.60	691,155.39	4.66
1930	13,856,227.31	14,795,367.00	939,139.69	6.78
1931	13,219,457.26	14,264,637.30	1,045,180.04	7.91
1932	10,958,358.54	12,036,778.60	1,078,420.06	9.84
1933	10,686,607.74	11,776,211.80	1,089,604.06	10.20
1934	12,876,835.92	14,133,161.40	1,256,325.48	9.76

¹ Decrease.

The tolls paid by the vessels of various nationalities using the Canal during the fiscal year 1934 are shown in the following table, in comparison with the tolls which they would have paid on the basis of \$1 per Canal net ton for laden ships and 60 cents for vessels in ballast. In this table the traffic has been segregated to show general cargo and cargo/passenger vessels, and the total of all commercial traffic; the latter includes, in addition to the general cargo and cargo/passenger vessels, oil tankers, and miscellaneous non-cargo-carrying vessels such as yachts, foreign naval vessels, etc. There is also shown the average per Panama Canal net ton of the tolls which were actually collected on laden and ballast traffic for the various nationalities.

On the assumption that the Panama Canal rules for the determination of net tonnage are an accurate basis for the just levy of Canal dues, it is obvious that the present use of the United States rules is resulting in inequities and injustices, since the ships are not paying at equal rates on net tonnage as determined under the Canal rules of measurement, i. e., on their earning capacity. The table follows:

HOURS OF OPERATION

Dispatching of ships through the Canal is conducted on schedules. Vessels ready to leave for transit begin moving through the Canal from each end at 6 o'clock in the morning, and dispatches are made thereafter from each end at intervals of about half an hour. The following is a summary of the arrangements in effect at the end of the fiscal year:

From Cristobal Harbor, first ship at 6 a. m., last at about 3:30 p. m.; from Balboa Anchorage, first ship at 6 a. m. and last at 2:30 p. m. This applies to vessels averaging 10 to 12 knots. In case of a vessel capable of 15 knots, departure may be made up to about 3 p. m. from Balboa and 3:45 from Cristobal.

Tankers with inflammable cargoes are dispatched at the discretion of the captain of the port and are not permitted to proceed unless they can clear Gaillard Cut before dark. Overloaded tankers carrying gasoline cargo are usually restricted to schedules leaving at 6, 6:30, and 7 a. m., but may be dispatched on other schedules if traffic warrants.

During the year, after the last "through" ships were dispatched, and provided there would be no interference with approaching traffic, ships were started on partial transit from Cristobal Harbor up to 8:45 p. m., or from Balboa Anchorage up to 5:30 p. m. Partial-transit ships tied up on reaching the summit level and continued the following morning. Two ships usually, sometimes three, each way, were given the benefit of partial transit each day, and under ordinary conditions they gained from 2 to 3 hours.

The volume of traffic at present is not such as to make advisable continuous operations throughout the 24 hours of the day, or even extensive night operation. Operations throughout the night would not only involve greater expense and increase the difficulties of maintenance of locks and channel but involve hazards of navigation in restricted channels under conditions of darkness, made worse by rains and fogs. Fogs over the cut and lake usually fall before midnight and are dissipated by 8 o'clock in the morning.

LOCKAGES AND LOCK MAINTENANCE

Lockages and vessels handled, by months, during the past fiscal year, are shown in the following table, to which is appended for comparison a statement of the totals for the preceding 5 fiscal years:

Month	Gatun		Pedro Miguel		Miraflores		Total	
	Lockages	Vessels	Lockages	Vessels	Lockages	Vessels	Lockages	Vessels
1933								
July	387	462	398	479	398	481	1,183	1,422
August	406	495	416	498	413	495	1,235	1,488
September	394	479	406	483	403	486	1,203	1,448
October	444	535	455	549	454	552	1,353	1,636
November	438	537	442	538	442	535	1,322	1,610
December	469	565	485	566	485	571	1,439	1,702
1934								
January	479	578	491	614	490	616	1,460	1,808
February	442	534	457	553	461	560	1,360	1,647
March	504	618	508	633	511	629	1,523	1,880
April	527	692	534	688	534	690	1,595	2,070
May	486	599	501	617	498	608	1,485	1,824
June	389	499	414	527	394	482	1,197	1,508
Total	5,365	6,593	5,507	6,745	5,483	6,705	16,355	20,043
Fiscal year—								
1929	6,289	7,428	6,473	7,994	6,325	7,934	19,087	23,356
1930	6,135	7,164	6,436	7,430	6,338	7,431	18,909	22,025
1931	5,571	6,477	5,824	6,667	5,783	6,651	17,178	19,795
1932	4,615	5,349	4,842	5,576	4,826	5,575	14,283	16,500
1933	4,380	5,334	4,557	5,536	4,505	5,586	13,442	16,456

In the fiscal year 1934 the average numbers of lockages per day were as follows: Gatun, 14.7; Pedro Miguel, 15.1; Miraflores, 15. The total number of lockages at all locks was 16,355, as compared with 13,442 in 1933 and 14,283 in 1932. The increase during the past year was 2,913, or 21.7 percent.

The number of vessels locked per lockage in the fiscal year averaged as follows: Gatun, 1.229; Pedro Miguel, 1.224; Miraflores, 1.223. The average for the total of 16,355 lockages was 1.225 vessels.

GATUN LOCKS

Both chambers were in service and were used each day during the year, except on July 19, October 18, and June 19, when only one chamber was used, due to light traffic. Daily operating shifts, providing for operation from 7 a. m. to 11 p. m. (with double chamber operation each day for approximately 8 hours during period of heaviest traffic), were maintained throughout the year, except for the periods from April 23 to 26 and April 27 to May 20, inclusive, when four shifts were used to provide 24- and 16-hour daily operation, respectively, to facilitate the transit of the United States Fleet and to avoid unnecessary delay to commercial shipping.

Routine maintenance and repairs were performed on all machinery and equipment as required. No serious break-downs occurred during the year. Twenty-five delays to ships in lockages, due to improper operation or failure of equipment, were recorded; they ranged from 2 to 25 minutes.

PACIFIC LOCKS

Operation continued on the same basis as for the preceding year, except as noted below. From April 23 to 26, inclusive, the operating shifts at both locks worked on the basis of 10 hours on and 10 hours off, on account of the rapid transit of the United States Fleet and the accumulated commercial traffic. From April 27 to May 20, inclusive, the operating shifts were changed on account of the 40-hour-week law, to provide for 6 days of 6½ hours each, with 3 shifts at Pedro Miguel and 4 shifts at Miraflores. Effective May 21, the shifts were returned to approximately the former normal operating basis, with employees working 5 days of 8 hours each.

At Pedro Miguel there were 10 delays to lockages, ranging from 3 to 15 minutes, due to faulty operation or failure of equipment. At Miraflores there were 14 delays, varying from 5 to 15 minutes, due to faulty operation or failure of equipment, in addition to which there were 7 delays, varying from 15 minutes to 6 hours, due to trouble aboard ships.

Monthly test operations were made of all emergency dams during the year, and routine maintenance and repairs were performed on all machinery and equipment.

POWER FOR CANAL OPERATION

The power system was operated throughout the year with a combined generator output of 68,994,100 kilowatt-hours, as compared with a combined generator output of 73,517,569 kilowatt-hours for the previous fiscal year. A total of 62,986,352 kilowatt-hours was distributed to consumers, as compared with 66,172,012 kilowatt-hours for the previous year. Transmission and distribution loss amounted to 6,007,748 kilowatt-hours, or 8.71 percent, during the year, compared with a loss of 7,345,557 kilowatt-hours, or 9.9 percent, during last year.

The Gatun hydroelectric station operated throughout the year, carrying the full load of the power system, except at times of peak loads and during periods in March and April, when it was necessary to conserve the water in Gatun Lake. The Miraflores Diesel-electric station was maintained on a stand-by and peak-load service during the year, and from March 5 to April 25 one or two engines were operated for water conservation. There were no interruptions to service at either station during the year.

Interruptions to transmission-line service during the year totaled 8, from the following causes: Lightning, 3; animals climbing towers, 4; and broken ground wire, 1.

During the year the manually operated old Gatun substation was abandoned. Prior to this abandonment, power had been generated at Gatun hydroelectric station at 6,600 volts and transmitted over 6,600-volt underground cables across Gatun Dam and Locks to the old substation where it was stepped down to 2,200 volts for distribution to Gatun Locks, Gatun town site, and other distribution points, and stepped up to 44,000 volts for transmission to other substations of the power system. To effect the discontinuance of the old substation, a small remote-controlled 6,600-volt to 2,200-volt local transformer substation was constructed to furnish 2,200-volt service to Gatun town site and other distribution points; a 6,600-volt to 2,200-volt transformer and switchroom was built at Gatun Locks for serving the locks with 2,200-volt power; the main 6,600-volt to 44,000-volt transformers were moved from the old Gatun substation to the Gatun hydroelectric station, and incorporated there is an outdoor switch and substation operated in conjunction with that station; and two 3-conductor 44,000-volt underground cable circuits were installed from the hydroelectric station across Gatun Dam and Locks to a remote-controlled outdoor switching station, located in conjunction with the 6,600-volt to 2,200-volt distribution substation, for connection to the 44,000-volt trans-Isthmian transmission lines. Power is now furnished direct to the locks and town site substation from the hydroelectric station over the 6,600-volt cables which formerly fed the old substation. Power for the other system substations is now generated at the hydroelectric station, stepped up there to 44,000 volts and transmitted across the dam and locks over the new 44,000-volt cable circuits to the trans-Isthmian transmission lines.

WATER SUPPLY

The inflow of water into Gatun Lake from all sources and the utilization and losses of the water in the lake are summarized in the following table. There are also shown the percentages which each item formed of the total yield or total consumption. The data are presented for the fiscal years 1933 and 1934, the former for comparison. Each year covers 12 months ending June 30, and thus embraces the cycle of both dry and rainy seasons:

	Billion cubic feet fiscal year—		Percent of total fiscal year—	
	1933	1934	1933	1934
Run-off above Alhajuela.....	89.13	72.80	38.0	37.3
Yield from land area below Alhajuela.....	101.05	80.46	43.1	41.2
Direct rainfall on lake surface.....	44.29	42.02	18.9	21.5
Total yield.....	234.47	195.28	100.0	100.0
Evaporation from lake surface.....	21.55	21.68	9.2	11.1
Gatun Lake lockages.....	31.78	37.81	13.6	19.4
Hydroelectric power.....	53.22	49.67	22.7	25.4
Spillway waste.....	136.83	75.03	58.4	38.4
Lock culvert discharge.....	3.34	-----	1.4	-----
Municipal use, leakage, etc.....	2.22	1.41	.9	.07
Total uses and losses.....	248.94	185.60	106.2	95.0
Increase in storage.....	-----	9.68	-----	5.0
Decrease in storage.....	-14.47	-----	-6.2	-----
Total.....	234.47	195.28	100.0	100.0

Floods or freshets with a rise of 5 feet or more at Alhajuela numbered 16 during the calendar year 1933. The maximum momentary discharge was 45,170 cubic foot-seconds at elevation 106.6 feet, on December 15, 1933.

From a water-supply standpoint the 1934 dry season began on January 9 and ended May 10, the total duration being 122 days. This is 13 days shorter than the dry season of last year and 9 days shorter than the average dry season which begins about December 29 and ends about May 8. The 1933 calendar year net yield (total yield less evaporation) of the Gatun Lake watershed was 788 cubic foot-seconds compared with a 21-year average of 833 cubic foot-seconds, or 5 percent below the average. The total yield was 1,692 cubic foot-seconds, of which 62 percent was furnished by the Chagres River. The lowest elevation of Gatun Lake was 82.54 feet on May 10.

In order to prevent Gatun Lake from falling below elevation 82 feet during the 1934 dry season the Miraflores Diesel plant operated 1 power unit from March 5 to March 27, and 2 units from March 28 to April 25, when the Gatun hydroelectric plant resumed full power load. Water saving by the Diesel plant amounted to 0.59 foot on Gatun Lake and the equivalent of 0.33 foot on the lake was saved by the Canal locks. Had no water saving been instituted, the lowest elevation of Gatun Lake would have been 81.62 feet. The transit of the United States Fleet during April required 58 lockages and 399,000,000 feet of water, the equivalent of 0.09 foot on Gatun Lake.

Operations of the Gatun spillway during the year totalled 1,685 gate-hours and of the Miraflores spillway 246 gate-hours.

MADDEN DAM PROJECT

Construction of the Madden Dam project was continued during the year. The major part of the work was carried on by the general contractor for the dam and appurtenant works, the W. E. Callahan Construction Co., and Peterson, Shirley, and Gunther. The accessory work of clearing was completed by contractors during the month of July 1933. All work was performed under the direction of the Government's designing, supervisory, and inspectional force embraced in the Madden Dam division.

FORCE EMPLOYED

The average monthly working force on this project is tabulated below:

	Gold	Silver	Total
U. S. Government.....	72	153	225
Contractors for dam.....	130	370	500
Total.....	202	523	725

Mr. Byram W. Steele of the Bureau of Reclamation visited Madden Dam during November and December 1933 for the specific purpose of inspecting the foundation rock in blocks 13, 14, and 15, and sailed for the States during December after submitting a report of his findings and recommendations covering this and other features of the work.

MADDEN DAM AND POWER PLANT

At the beginning of the fiscal year 1934 the excavation for Madden Dam and power plant was practically complete and concrete in the spillway section was all at elevation 100 or higher. The concreting period which opened the year came to a close on October 21 with all spillway blocks excepting nos. 5 and 7 at elevation 205 or higher. At the end of November, with the diversion of the river through the sluices and with the unwatering of the area under blocks 13, 14, and 15, excavation was again resumed.

By the third week in January the penstocks and outlet pipes had been assembled and embedded in concrete, and the Government forces had completed the scroll-case assemblies for the generator units. The power-house walls were raised high enough by the middle of April to permit the placing of the needle valves and the completion of the outlet pipes that lie within the power-house walls.

The setting of the drum-gate pier plates was begun on May 3 and completed on May 22, thus permitting the concrete in the piers to rise

up to and above the spillway-arch skewbacks. No. 1 gate was lowered by floating on June 8, and the centering for the arch above this gate was begun 2 days later. No. 2 gate was lowered on June 23 and the centering for this arch followed immediately. Erection of No. 4 gate was not begun until May 24 and that of No. 3 gate was begun on June 1. Both of these gates were still far from complete at the end of the fiscal year.

All excavation on the right abutment was completed in April. With the exception of the removal of some rock above the loading platform and the east end of the power-house road, all excavation on the left abutment was complete at the end of the year. During this period, blocks 1 and 2 were begun, and the sluice-gate trash-rack structures were carried to completion, as was also the paving over the right training wall.

With the advent of the dry season it was deemed safe to close the overflow channels heretofore provided by blocks 5 and 7, and these were poured from elevation 100 to elevation 105 on January 13 and 15, respectively. Placing was then confined to blocks 5, 7, 13, 14, and 15, but small pours in the power house and on the right abutment blocks and upstream aprons were made in conjunction with the larger block pours; these latter included all of the power house below elevation 128 and east of the power house east wall. Early in February pouring was resumed on the left abutment. On February 12 the first pour of the power-house walls above elevation 108.75 was made, and that of the penstock trash-rack structures occurred on March 18. Placing never attained the volume during this period that it had known prior to this fiscal year, the maximum pour in any 1 month being 38,100 cubic yards during February, which represented the combined yardage in Madden Dam and the power house. During May the dam had reached such a height generally that it became necessary to shorten the track cable of the cableway to a 5-percent sag from its previous 6-percent sag.

By June 30 the power-house interior had been completed, except for two removable slabs, and the walls were at elevation 161.50.

RIVER CONTROL DURING CONSTRUCTION

On November 17 the timber crib intended to divert the flow of the river from its course over blocks 13, 14, and 15, and the power house, was set in place. It was sheeted and filled with rock to elevation 105, and the river was flowing through the six sluiceways on the following day. Placement of temporary stop logs in the power house to form a tail-water cofferdam was begun on November 20. This was built to elevation 101. Unwatering of the former diversion channel was begun on November 22. On November 24 a flow of 19,200

cubic foot-second topped the crib and flooded the workings. The crib was immediately raised to elevation 113, but the filling and decking had been only partially completed when a flow of 35,000 cubic foot-second took place on November 26, followed by another of 18,000 cubic foot-second on the 27th. All of these, of course, flowed over blocks 5 and 7 which had been left down at elevation 100 for this purpose. On December 1 a small flow of 13,000 cubic foot-second overtopped the tail-water cofferdam, which was then raised to elevation 102.4. The workings were then unwatered and excavation resumed. On December 15 occurred the largest flood of the season, 45,500 cubic foot-second, which flooded the hole and delayed concreting for 1 day. On January 20 all concrete in Madden Dam was above elevation 110; subsequent to this the free flow of the river ceased and formation of Madden Lake was begun, its level controlled by the sluiceways, and fluctuating between elevations 97 and 164.5.

PRESSURE GROUTING

The nature of the rock over the right training wall made grouting of this area advisable, and accordingly 24 holes were drilled and grouted. Prior to any grouting, however, targets were set in the rock face so that they were all in line between a fixed transit point and a far distant foresight. Observations were taken frequently during the grouting of each hole, whether at night or in the day time, to detect any movement of the rock, but none occurred. When the required depth of concrete had been placed in December over the foundation rock of blocks 13, 14, and 15, grouting of the cut-off trench holes was begun, together with a large number of special holes west of the cut-off trench. Seven holes were drilled at very flat slopes under the upstream apron to seal the surface opposite the blocks. This program was later extended to include eight holes drilled through the apron opposite blocks 16, 17, and 18, and sloping west under the blocks themselves.

A total of 2 foundation uplift pipes, 24 internal uplift pipes, 52 thermometers, 34 strain meters, 19 measuring posts, 37 piezometers in concrete, 48 piezometers on drum gates, penstock pipes, outlet pipes, scroll cases, needle and butterfly valves, and 12 ten-foot gage rods were installed during the year.

CONCRETE WORK

A special test is in progress at the concrete testing laboratory to determine the modulus of elasticity of the concrete placed around the electric strain meters imbedded in block 9 of the main dam. To date 225 specimens (6- by 12-inch and 8- by 16-inch cylinders) have been made from concrete covering the strain meters.

The various routine reports of the concrete inspection department were continued throughout the present year.

AGGREGATE PLANTS

The plant, equipment, and general scheme of operations at the aggregate loading terminal were generally those described in the annual report for 1933. The Monighan walking dragline was the loading unit used throughout the year.

The tramway system gave very dependable service through the year, with only one break of the track cable; otherwise there were no operating difficulties with this unit. The amount of raw material taken from the aggregate pits and handled over the tramway system was as follows:

	Tramway buckets	Cubic yards
Total for fiscal year.....	397,158	476,590
Previously reported.....	281,847	334,041
Total to date.....	679,005	810,631

The aggregate classification plant and equipment remained the same during 1934 as described in the annual report for 1933. Daily inspections and tests were made, as well as minor plant adjustments from time to time, to conform with changes in the quality and grading of raw material.

On June 30, 1934, the cement silo at Madden Siding was emptied and final inspection made of this structure; as no further use is expected to be made of this silo, the balance of the cement to be hauled will be hauled in bags. The final concrete shipment for the contract at Madden Dam arrived at Balboa on June 4, 1934.

The general scheme of operation and inspection at the mixing plant was carried out as outlined in the annual report for 1933. During the month of July the plant output for 69 eight-hour shifts averaged 784 cubic yards, representing peak production per shift worked and being also the highest yardage for any one month during the year. A total of approximately 338,205 barrels of cement was used during the year.

At the close of the year the concrete work was approximately 99 percent complete, there remaining only approximately 5,050 cubic yards to be placed. The major part of reinforced concrete work and concrete placing in small and difficult sections of the structures was done during the fiscal year 1934. This was in the penstock trash racks, spillway crests and piers, roadway on abutments, power house, etc. These pours ranged from 100 to 400 cubic yards per 8-hour

shift. Electric vibrators were continued in use as necessary parts of the placing equipment.

The concrete in the left ridge dam was performed by local contractors, totaling 3,167 cubic yards, and was completed on March 1, 1934, at a contract price of \$12 per cubic yard, including preparation of subgrade. The concrete in the parapet wall was likewise performed by local contractors, totaling 902.92 cubic yards, at a contract price of \$12 per cubic yard, including preparation of sub-grade. After placing of the slope paving of the left ridge dam, excavation for the base slab of the parapet wall was started by the subcontractor; no forms were used for pouring this base, concrete being placed between slope paving slab and neat excavation line on the roadside.

The concrete work in the various highways at Madden Dam was awarded to local contractors and involved approximately 3,933 cubic yards. The concrete in walkways through saddle dam no. 8 and left ridge dam was likewise awarded to local subcontractors, involving approximately 199 cubic yards.

ELECTRICAL AND MECHANICAL WORK

The installation of elastic wire-strain meters as contemplated by the plans was completed during July 1933, the last of the 102 strain meters being embedded in concrete on July 30. Of the 102 strain meters embedded, 16 have become defective and 5 others are beginning to show erratic symptoms. The installation of resistance thermometers, a total of 70 units, was also completed during the year. Uplift pressure pipes, consisting of 28 in various locations in the base of the dam, and 24 in various locations in the body of the dam, have also been installed. Test equipment installation was made on drum gate no. 1, consisting of piezometer and pipe connections at suitable locations on the skin plate of this drum gate for the purpose of observing the efficacy of the air inlet below the crest of the gate.

At the close of September 1933 the 12 sluice gates were completely installed. The work of placing outlet pipe steel followed in close order and by the end of January 1934 all of the outlet pipes were in place except the extension of the outlet pipes through the power station. By the end of the same month all of the above installed penstock and outlet pipes, consisting of about 733,000 pounds of steel, were completely riveted, calked, and embedded in concrete.

The fifth butterfly valve was completed during the month of January, all five valves having been imbedded in concrete at that time. The weight of the five valves, including their operating mechanism, is approximately 356,000 pounds. The installation of the two 84-inch

differential needle valves was started about the middle of April, and bases were grouted by the end of June; the total weight installed was about 247,000 pounds. The four drum gates, each 100 feet long and 18 feet high, and weighing over 1,400 tons, were received and the work of assembly and erection was in active progress throughout the balance of the fiscal year. Erection of the hydraulic turbines was started by Government forces during December; the draft tube liners and speed rings of both turbine units were assembled and placed on line and grade. The installation of electric conduits in the power station was also begun during December 1933 and that in the dam was started during January 1934; the total installation was 17,695 feet.

SADDLE DAMS, BORROW PITS, QUARRIES, AND ROADS

The entire slope paving of the left ridge dam was put in place during the dry season, having a length of 3,077.82 feet, station measurement, and of a width varying according to the level of the ground. The parapet, sidewalk, and roadway paving were completed except for about 200 feet near the counterforted wall. Saddle dams nos. 5, 6, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18 were maintained by the contractors during the year, growing brush being cut and a few fills being made where gullies developed from rain eroding the slopes; the slopes are now becoming overgrown with grass which will probably make it unnecessary to perform any considerable amount of maintenance work in the future. The road to and across saddle dam no. 8 was completed except for about 250 feet just north of Madden Dam. The parking space at saddle dam no. 8 and the rubble masonry wall around it were placed during the year.

During the year the first paving on the Madden Dam highway was placed. The total length of this road was 3,817.87 feet, with a thickness of 6 inches, and varying from 14 to 16 feet in width. A gravel road was built from the end of the concrete road on saddle dam no. 8 to and across saddle dam no. 11, crossing saddle dam no. 10 on the way. In order to provide a space for landing boats in Madden Lake near the dam, a road was built from the contractor's gravel road upstream from left ridge dam at a point near high water in the lake to a point at about elevation 160.

RIDGE TIGHTENING

Ridge tightening by injection of clay grout was continued throughout the year, the work being entirely in area no. 2. The north end of the area which was grouted first proved rather tight but as the grouting proceeded to the south the rock began to take more and more

grout. The amount of this class of work performed during the year is indicated by the following:

Number of holes drilled.....	31
Total length of holes drilled.....	feet.. 3,820
Amount of grout injected.....	cubic yards.. 11,934

CLEARING IN RESERVOIR

Four adjoining tracts alongside the Pequini traffic land above San Juan were cleared, and a total of 416 acres was added to the cleared areas of the reservoir during the year, at an approximate cost of \$38 per acre. This makes a total cleared area of approximately 2,888 acres.

STATUS OF THE MADDEN DAM PROJECT

The revised estimate covering the Madden Dam project was \$4,500,000. Thirty-one payments have been made the contractors, amounting to a total of \$4,185,606.71, including \$72,139.96, which was a part of the 10 percent of earnings withheld at the end of the fiscal year 1933. The amount of the retained percentage is now \$163,250.45.

STATUS OF THE MADDEN DAM PROJECT

It is anticipated that the contract work will be completed about the end of October 1934 and that the power plant will be ready for operation during February 1935.

MAINTENANCE OF CHANNEL AND IMPROVEMENT PROJECTS

All dredging operations embracing maintenance of Atlantic entrance, Gatun Lake, Gaillard Cut, Miraflores Lake, and Pacific entrance sections of the Canal, with auxiliary dredging at North Cove, Cristobal Drydock Slip, new dredging station at Gamboa and at Balboa drydock gates and including Chagres River gravel and Chamé sand operations and operation of Thatcher Ferry at Balboa, have been directed from the division headquarters at Paraiso. A field office was maintained at Balboa during July, August, and September and one at Cristobal from July 1 to November 18, 1933, and again from May 26, 1934, to the end of the fiscal year.

Excavation during the fiscal year is summarized in the following table:

Location	Maintenance		
	Earth	Rock	Total
CANAL PRISM DREDGING			
Atlantic entrance (maintenance).....	<i>Cubic yards</i> 2,240,100	<i>Cubic yards</i> 9,600	<i>Cubic yards</i> 2,249,700
Gatun Lake:			
Maintenance.....	776,750	77,400	854,150
Project no. 3.....	145,000	-----	145,000
Gaillard Cut:			
Project no. 3.....	12,350	90,550	102,900
Project no. 5.....	7,450	20,200	27,650
Maintenance, including slides.....	1,302,300	432,100	1,734,400
Miraflores Lake:			
Project no. 6.....	119,800	19,250	139,050
Maintenance.....	92,900	-----	92,900
Pacific entrance:			
Project no. 1.....	7,150	171,400	178,550
Maintenance.....	40,100	600	40,700
Total.....	4,743,900	821,100	5,565,000
Cristobal approach channel (maintenance).....	49,000	-----	49,000
North Cove stock pile.....	321,500	-----	321,500
Cristobal cofferdam removal.....	28,467	3,100	31,567
Cristobal Drydock Slip.....	6,133	-----	6,133
Dredging station, Gamboa.....	185,000	85,000	270,000
Balboa drydock gates.....	2,500	-----	2,500
Total.....	592,600	88,100	1,680,700
Grand total.....	5,336,500	909,200	6,245,700

¹In addition 1,020 cubic yards of Chamé sand were produced by Crane boat *Atlas*.

Dredging operations at the Canal are divided in three major districts: The northern district, from contour 42 feet below mean sea level in the Atlantic Ocean to Gamboa; the central district, Gaillard Cut, from Gamboa to Pedro Miguel Locks; the southern district, from Pedro Miguel Locks to contour 50 feet below mean sea level in the Pacific Ocean. Excavation in these three districts is summarized as follows:

	Canal prism			Auxiliary			Total		
	Earth	Rock	Total	Earth	Rock	Total	Earth	Rock	Total
	<i>Cu. yds.</i>	Cu. yds.	Cu. yds.	Cu. yds.	Cu. yds.	Cu. yds.	Cu. yds.	Cu. yds.	Cu. yds.
Northern.....	3,161,850	87,000	3,248,850	590,100	88,100	678,200	3,751,950	175,100	3,927,050
Central.....	1,322,100	542,850	1,864,950	-----	-----	-----	1,322,100	542,850	1,864,950
Southern.....	250,950	191,250	451,200	2,500	-----	2,500	262,450	191,250	453,700
Total.....	4,743,900	821,100	5,565,000	592,600	88,100	680,700	5,336,500	909,200	6,245,700

CANAL IMPROVEMENT WORK

Improvement project no. 1.—This project, consisting of deepening the Pacific entrance channel from Miraflores Locks to the sea buoys and including the Balboa Inner Harbor, from -45 feet to a ruling depth of -50 feet (mean sea level datum), was begun in 1924. Projects 1-A and 1-B, Pacific entrance, and project 1-A, Balboa Harbor, were subsequently authorized as outlined in the annual report for the fiscal year 1931.

The total excavation for the fiscal year was 7,150 cubic yards of earth, 106,450 cubic yards of unmined rock, and 64,950 cubic yards of mined rock, or a total of 178,550 cubic yards of material, from project no. 1, Pacific entrance.

There was no dredging on project no. 1, Balboa Harbor, during this year.

At the end of the year excavation on the Pacific entrance portion of this project was 83.2 percent completed and on the harbor portion 90 percent completed.

Project no. 3.—Work on this project was started during September 1929. During the fiscal year a total of 247,900 cubic yards was excavated on the Gaillard Cut and Gatun Lake sections of this project, and excavation was 58 percent completed.

Project no. 5 (revised).—This project, consisting of widening the Canal channel to the westward, Gaillard Cut approach to Pedro Miguel Locks, was started in December 1930. Excavation was carried on during the year by the use of dynamite for breaking rock and shore mining. Excavation for the year from this project amounted to 27,650 cubic yards, excavation being 63 percent completed at the end of the fiscal year.

Project no. 6.—This project, consisting of widening Miraflores Lake channel, was begun in April 1932. Total excavation during this fiscal year amounted to 139,050 cubic yards on this project, excavation being now 73 percent completed.

Project no. 9.—This project, which consists of widening the channel fronting the West Culebra slide, was started during June 1928. No dredging work was performed on this project during the fiscal year, 98 percent of the excavation being completed.

Gaillard Cut (maintenance).—The pipe-line suction dredge *Las Cruces* and the dipper dredge *Cascadas* worked 61 days and 165 days, respectively, on general clean-up work in Gaillard Cut during the year, excavating a total of 1,620,100 cubic yards of earth and rock from the area. Material removed by suction dredge was pumped into the Mandingo River through pipe line, and that removed by the dipper dredge was loaded in barges and dumped north of Gamboa.

Atlantic entrance, Cristobal Harbor, and Gatun Lake.—At the Atlantic entrance, a total of 2,249,700 cubic yards of earth, silt, and coral rock was removed. A total of 49,000 cubic yards of earth and silt was removed and deposited in shoal water east of the Canal axis. At Gatun Lake a total of 743,000 cubic yards of material was removed by pipe-line suction dredge, consisting of rock, clay, silt, and gravel, all of which was pumped to the proposed Gamboa industrial area and townsite fills. Earth and rock to the extent of 111,150 cubic yards were also excavated from Gatun Lake by dipper dredge, being loaded in scows and dumped north of Gamboa.

Pacific Entrance, Balboa Harbor and Miraflores Lake.—There was 40,700 cubic yards of earth and rock removed by dipper dredge from the Pacific entrance and dumped at sea. No dredging was performed in Balboa Harbor during the year. Ninety-two thousand nine hundred cubic yards of earth were removed from Miraflores Lake by dipper dredge and dumped to the eastward of the channel.

AUXILIARY DREDGING

North Cove Stock Pile.—Work was begun in July preparing a site near Fort Randolph for a stock pile of 150,000 cubic yards of sand and coral for the United States Army. Approximately 9 acres of land were cleared and bulkheads were built along the north and east sides, the west and south sides being closed by embankment except for a low temporary bulkhead for run-off. A total of 321,500 cubic yards of material, including usable sand and coral, was removed and pumped to the stock pile area through pipe line. Of this amount, 182,600 cubic yards of usable sand and coral remained in place on the pile. Completed stock pile was turned over to Army authorities on September 11, 1933.

Dredging station, Gamboa.—Preliminary construction work on this project was begun in October with installation of bulkheads for retention of hydraulic fill. Dredging operations during November, December, January, April, and May excavated a total of 1,158,000 cubic yards of material, which was distributed mainly to the Gamboa industrial area and in the low areas of the Gamboa town site and on breakwater and dumps north of Gamboa. A total of 3,980 lineal feet of bulkhead construction was completed during the year.

SLIDES

The majority of the slides were either quiescent through the year or showed only slight or occasional surface movements.

The Culebra slide extension (east), which first moved into the Canal during November 1931, showed a slight surface movement during July. Grader operations, as a slide preventive measure, were continued from the preceding year in the area adjacent to this slide during the succeeding 3 months, during which time a total of 37,300 cubic yards of material was sluiced into the Canal and removed by dredges.

The Culebra slide (west) was in slow continuous movement through the year and 69,700 cubic yards of earth and rock were removed by the dredge *Cascadas* from this area, in addition to which 28 holes were drilled for a total of 298 lineal feet and 600 cubic yards were broken by the use of dynamite. Dynamite was also used in

breaking 4,100 cubic yards of rock at Culebra slide (east), at which point 618 holes were drilled for a total of 2,515 lineal feet. Only slight movement was indicated at the latter slide during the year.

The Cucaracha slide, which had been practically quiescent since the movement of July 1927, became again active on July 6, 1933, pushing approximately 50,000 cubic yards of material into the basin the movement continuing during the months of August, September, and October. A total of 44,600 cubic yards of rock and earth was removed by dipper dredge from this slide, and sluicing operations were conducted in the back of the slide as a slide preventive measure, with a view to relieving the pressure immediately behind the moving area. A total of 51,350 cubic yards of material was sluiced into the Canal and removed by dredges.

There were numerous small breaks at various points in Gaillard Cut during the year but there was no interference with shipping on account of slides during the period.

The total slide excavation for the fiscal year amounted to 119,300 cubic yards.

Considerable grading and excavation was done during the year in carrying on the work of slide prevention by correction of improper drainage conditions, thereby reducing the effect of erosion, and daily inspections were made of all portions of active slide areas fronting the Canal, as well as periodical observation of all areas affected.

SUBSIDIARY DREDGING ACTIVITIES

At the Chagres River gravel plant at Gamboa there were on hand at the beginning of the year 79,580 cubic yards of gravel and sand. During the year 35,654 cubic yards were shipped, leaving 43,926 cubic yards on hand at the close of the year. No additional material was produced during the year.

The work of removing floating obstructions and water hyacinths in Gaillard Cut, Miraflores and Gatun Lakes was continued during the year. The number of hyacinth plants destroyed during the year by pulling or spraying with arsenic and soda was estimated at 48,846,310.

Log booms were maintained at the mouths of the Chagres and Mandingo Rivers to prevent hyacinths, trees, and other floating obstructions drifting into the Canal during freshets. In spite of these precautions it was found impracticable to hold the Gamboa Bridge boom during the freshet of November 27 and 28 and large quantities of debris were carried into the Canal and lake. This driftwood, amounting to approximately 2,600 cords, was removed and burned along the river bank during the following dry season.

The crane boat *Atlas* pumped 1,020 cubic yards of sand into barges at Chamé and delivered it alongside the Balboa coaling station unloading dock for use of the supply department.

EQUIPMENT

On May 14 the new crane boat *Atlas* was delivered to the dredging division by the mechanical division, test runs were made, and the vessel was placed in service in Chamé sand production and as a suction dredge, sea-going type. Work request was issued for a new hydraulic grader to replace the obsolete equipment in use, barge No. 21 to be used as a hull for this new hydraulic grader. A new barge, No. 127, was launched on June 28, 1934.

The following floating equipment was employed during the fiscal year: Two 15-yard dipper dredges *Cascadas* and *Paraíso* operated for 10½ months and 1½ months, respectively; the 24-inch pipe-line suction dredge *Las Cruces* was in service for 11½ months during the year; hydraulic grader No. 3 was operated for 6½ months; drill boat *Terrier* No. 2 was operated 11½ months during the year; air compressor No. 29 operated 10 months during the year; excavator No. 1 was in active service during the entire year; the 250-ton cranes *Ajax* and *Hercules* were operated on alternate months except when calls for extra service required the commissioning of both cranes; the crane boat *La Valley* was operated until retired from service on May 18, 1934; the new crane boat *Atlas* was placed in service on May 14 and operated during the remainder of the year; three large tugs were operated during the year, as well as nine launches. The Diesel ferry-boats *President Roosevelt* and *Presidente Amador* were engaged in operation of the ferry service at Balboa during the year.

GAMBOA TOWN SITE

A topographical survey was made of Gamboa and its environs and a plan for a new Gamboa town site developed. This includes a complete street and building location plan, together with provision for future expansion. The plan contemplates the accommodation of all dredging division and lighthouse subdivision personnel, and embraces a complete industrial area with shops, docks, etc. The estimated construction period for this project is 6 years.

AIDS TO NAVIGATION

The maintenance of lights, buoys, beacons, etc., in the Canal and adjacent waters was continued during the year, and several improvements and adjustments were made in such navigational aids. Rear range target no. 50 was moved 500 feet to the southeast, on the range, and a range target showing a fixed white light, numbered 50-A, was established on the old position of range target no. 50. An electric center-line range target, no. 44-A, fixed green with 100-watt lamp on 39-foot mast, was established December 29, 1933, between front and

rear targets at the north end of Gaillard Cut. Concrete electric beacon no. 27 in Gamboa reach was discontinued due to dredging division project at Gamboa. On May 18 a gas buoy, painted black, showing a flashing white light, was established in 7 fathoms of water, 300 feet 100° true from center of English Rock in the Pacific. A first-class spar buoy, painted black, marking the position, was placed near the lighted buoy; this buoy was planted in order to assist survey vessels of the Navy surveying in those waters, and it is intended to remove it when new charts for the area are issued about July 1, 1935. A 46-foot spar buoy, red, was established off west end of Dock 8, Balboa, replacing a nun buoy. Sun relays were installed on range towers nos. 1 and 2, Atlantic entrance. Lamp changers were installed on range lights nos. 5 and 6, Gatun Lake, on range towers nos. 1 and 2, Pacific entrance, and at Flamenco lighthouse in the Pacific.

Work accomplished at Taboguilla lighthouse in the Pacific consisted of construction of forms for concrete footings, runway, and tankhouse, installation of new concrete footings and wall, enlarging platform, building concrete runway 14 feet long, new tankhouse, and concrete base for tanks. At Farallon Sucio light, in the Atlantic, main platform and steps were built. At Isla Grande light, in the Atlantic, construction of a power house was begun, which, when completed, will accommodate two new Diesel electric generators furnishing power for this light.

ACCIDENTS TO SHIPPING

The board of local inspectors conducted investigations and submitted reports covering 34 accidents of marine nature occurring to vessels either in transit or in the terminal ports of the Canal, as compared with 26 for the previous fiscal year. Classification of the 34 accidents shows the following: Took sheer leaving lock, 1; chocks damaged while in locks, 2; struck dock while berthing, 2; struck Canal bank, 5; broke pile while unberthing, 1; grounded, 2; touched lock wall and/or fenders, 7; collision between ships, 3; sunk in Gatun Lake, 1; struck shoal spot in Gaillard Cut, 1; compartments flooded while berthed, 1; fouled cable in Gaillard Cut, 2; collision between launches, 1; ships damaged by Canal tug, 3. In two of the cases investigated, damage was alleged but not proved.

Following is a brief summary of the more serious accidents, in chronological order:

Date	Vessel	Cause of accident	Estimated damage	Responsibility attributed to—
1933 Aug. 20	President Wilson.....	Collision with U. S. S. <i>Swan</i>	\$7,000	Vessels.
Nov. 22	Standard.....	Struck bank of Canal.....	23,000	Panama Canal
Dec. 5	Wilhelm A. Riedmann.....	Collision with steamship <i>Willamette Valley</i> .	1,400	Vessels.
5	Willamette Valley.....	Collision with M. S. <i>Wilhelm A. Riedmann</i> .	4,800	Do.
1934 Feb. 19	F. W. Abrams.....	Struck lock approach wall.....	1,100	Do.
May 31	Livingston Roe..... do.....	do.....	1,000	Do.

On January 21, 1934, the steamship *Brion*, a single-screw, steam-reciprocating vessel of 761 gross tons, while transiting the Canal northbound suddenly listed about 5° to port, the list subsequently increasing to about 50°. The master and crew were unable to discover the cause of the list, nor could the vessel be brought back to normal trim. An unsuccessful attempt was made to save the *Brion* by beaching but after the bow was shoved against the bank the vessel turned over on her port beam and sank in approximately 13 fathoms of water with her bow 150 feet from the east bank of anchorage basin in Gatun Lake.

SALVAGE OPERATIONS

No major salvage operations were performed during the year.

The tender *Favorite* performed one seagoing towing job during the year, responding to a call from the steamship *Witell*, which was disabled through loss of propeller. The *Favorite* arrived at the position of the *Witell*, latitude 10°33' N. and longitude 96°02' W. on January 21 and arrived at Balboa with the disabled vessel in tow on January 28.

METEOROLOGY—HYDROLOGY—SEISMOLOGY

Precipitation.—For the calendar year 1933 precipitation in general was below normal. Annual totals for the Canal Zone and vicinity ranged from 67.77 inches at Balboa, to 139.85 inches at Gatun. The maximum precipitation recorded in 24 consecutive hours in the Canal Zone and vicinity was 9.05 inches at Gatun on October 19 and 20. The average precipitation in the Pacific section was 69.60 inches; in the central section 96.91 inches, and in the Atlantic section 134.27 inches.

Air temperatures.—The maximum and minimum temperatures of years of record at various stations, revised to June 30, 1934, and the annual average temperature for the years of record, are shown in the tabulation following:

Station	Maximum	Minimum	Annual average	Years of record
	° F.	° F.	° F.	
Balboa Heights.....	97	63	78.7	28
Alhajuela.....	98	59	78.5	23
Gatun.....	95	66	80.4	23
Cristobal.....	95	66	80.0	26

The average air temperature for the calendar year was below normal except over the Atlantic coast, where it was normal. April was the warmest month and November the coolest of the calendar year.

Winds and humidity.—For the calendar year 1933 the annual wind movement was in general below the normal. February was the month of greatest average wind velocity and July the month of the lowest. The mean relative humidity of the atmosphere for the calendar year 1933 was about 83 percent on the Pacific coast and 80 percent on the Atlantic coast. February was the month of least average relative humidity and November the greatest.

Tides.—For the calendar year 1933 the maximum high tide at Balboa, 10 feet (above the zero gauge), occurred on August 8; the maximum low tide there, 9.8 feet (below the zero gauge), occurred on April 11 and 12. The greatest daily range there, 19.2 feet, also occurred on April 11 and 12. At Cristobal the maximum high tide, +1.39 feet, occurred on November 16; the maximum low tide, -0.99 foot, occurred on May 14; and the greatest daily range there, 1.98 feet, occurred on December 16.

Seismology.—Seventy-eight seismic disturbances were recorded at Balboa Heights seismological station during the calendar year 1933. Twenty-four of these were of comparatively close origin, less than 200 miles distant, 13 of which were generally felt in the Canal Zone and vicinity. Twenty-four were of distant origin and 30 were so slight that no estimate could be made of their epicenter. Twenty-four shocks were recorded in November, 13 of them occurring on the 22d, most of them originating in the region of El Volcan and Bocas del Toro, in the Republic of Panama.

TRANSIT OF UNITED STATES FLEET

At 6 a. m. on the morning of April 23 the United States Fleet, consisting of 110 ships, began north-bound transit, and the entire 110 units were passed through the Canal without damage or especial incident in approximately 48 hours. Tandem lockages were used for the destroyers, submarines, mine layers, etc., and during this period all locks were manned with 8 locomotive crews for both chambers during the whole 24-hour day. Immediately following the fleet transit, the same organization commenced to pass through the Canal the

commercial traffic which had accumulated at each end during the fleet transit. By the morning of April 27 this accumulation had been disposed of and conditions were normal.

RULES AND REGULATIONS

The rules and regulations for the navigation of the Panama Canal and adjacent waters effective January 1, 1926, issued under Executive order of September 25, 1925, were supplemented by the promulgation on February 15, 1934, of Supplement No. 4 to these regulations, to regulate the transportation of hazardous cargoes in Canal waters. The new regulations became effective 1 month from date of promulgation, and a period of 6 months from that date was allowed for making the necessary structural changes in vessels to meet the new requirements, which time limit for completion of structural changes was subsequently extended to December 15, 1934.

SECTION II

BUSINESS OPERATIONS

Because of the relative remoteness of the Panama Canal from places of supply and repair, the Canal organization maintains facilities for the repair and supply of ships as well as for the operation and maintenance of the Canal and the care of employees. These facilities are operated by "business divisions" of the Canal organization and units of the Panama Railroad Co. For accounting purposes the Canal and railroad organizations are separate but in administration and performance of work they are united and under the central control of the Governor of the Panama Canal.

PANAMA CANAL BUSINESS OPERATIONS

The profits, or excess of revenue over expenses, for the business activities of the Panama Canal amounted to \$1,366,755.12 for the year, as compared with \$1,135,708.62 for the fiscal year 1933. This was an increase of \$231,046.50, or 20.3 percent. Of the indicated excess of revenues over expenses in 1934 the sum of \$596,554.74 is due to impoundings of percentages of salaries and wages in accordance with the economy acts. During 1933 this figure was \$475,585.34. The excess, not counting the impoundings, would be \$770,200.38. Similar figure in 1933 was \$660,123.28, an increase of \$110,077.10, or 16.7 percent. The profits were made principally in the electric light and power system, the shops and drydocks, and the fuel-oil-handling plants. The results are presented in some detail in table 26 in section V.

In the accounting of profits and losses of the business activities there is no actual interest charge on the money invested in these plants and their equipment. This investment totaled \$27,264,922.75 at the beginning of the fiscal year and \$26,776,633.32 at the end (table 4, sec. V). To establish a criterion for profit, a capital charge has been calculated, based on 3 percent of the capital investment (with minor variations such as 2 percent on public works in Panama and Colon, and 1½ percent on the shops at Balboa, which for reasons of national defense were made somewhat more extensive than the needs of commerce require) plus relatively slight amounts representing variations in supplies on hand. This theoretical capital charge for the fiscal year 1934 was \$783,324.77 (table 20, sec. V). The profits

of \$1,366,755.12 exceeded this amount by \$583,430.35. The profits of \$770,200.38 without the inclusion of the economy act impoundments was less than the capital charge by \$13,124.39.

Based on the figure of \$27,264,922.75, representing fixed property and equipment alone at the beginning of the year, the profits counted at \$1,366,755.12 showed a return of 5 percent; counted at \$770,200.38, the profits showed a return of 2.82 percent on the capital invested.

MECHANICAL AND MARINE WORK

The volume of work performed for the Panama Canal, which is the principal item in the work of the mechanical division shops, showed a decrease of \$145,478.42, or 10.5 percent, as compared with the preceding fiscal year. Work for the Panama Railroad Co. showed a decrease of \$116,716.38, or 26 percent, as compared with the fiscal year 1933. Work for other departments of the Government showed a decrease in comparison with the fiscal year 1933 of \$228,449.99, or 29.3 percent. Work for individuals and companies, including that of ships transiting the Canal or calling at terminal ports, showed an increase of \$41,669.48, or 12.9 percent, as compared with the preceding year. For the 5 fiscal years from 1925 to 1929, inclusive, the value of work for individuals and companies averaged approximately \$925,000 a year. Compared with this, the amount of work in 1930 and 1931 was about two-thirds normal and the amount for 1932, 1933, and 1934 about one-third normal work.

The total volume of work for all interests was \$2,486,762.31, a decrease of \$448,975.31, or 15.3 percent, from the preceding year. This compares with a decrease of \$130,900.79, or 4.27 percent from 1932 to 1933.

The value and class of work done and the sources of the same for 1933, as compared with the 2 preceding years, are shown in the following table:

	1932	1933	1934
Amount of work completed:			
Marine.....	\$1,969,748.14	\$1,780,519.25	\$1,598,155.48
Railroad.....	499,761.06	430,051.40	309,030.68
Stocks and materials.....	207,178.82	340,737.30	129,758.38
Sundries.....	389,857.91	384,429.67	449,817.77
Total.....	3,066,545.93	2,935,737.62	2,486,762.31
Origin of work completed:			
Individuals and companies ¹	303,490.55	322,195.16	363,864.64
The Panama Canal.....	1,416,811.97	1,385,288.93	1,239,810.51
Panama Railroad Co.....	569,785.37	448,735.58	332,019.20
Other departments of United States Government.....	776,428.04	779,517.95	551,067.96
Total.....	3,066,545.93	2,935,737.62	2,486,762.31

¹ Includes Panama Railroad Steamship Line.

The continued small volume of work necessitated part-time employment in all departments of the mechanical division until the 40-hour week law was placed in effect March 28, 1934. Prior to this date furloughs varied according to the work available but bore harder on the individual than during the preceding year. During the year work given the division by the Navy held up fairly well in volume, work from the National Recovery Administration, particularly the building of a 1,000-yard scow for the dredging division, and the construction of the new Pier 15 at the Cristobal shops aided in keeping a considerable number of men from being thrown out of employment. Certain other National Recovery Administration projects also enabled the temporary transfer of mechanics. Following the advent of the 40-hour week about 20 gold employees were gradually added to the force and about twice that number of silver employees. These just about made up the separations that occurred during the year through transfers to other divisions, retirements, deaths and resignations.

DRYDOCK AND MARINE WORK

The rebuilt and enlarged drydock at Cristobal was first put to use December 13, 1933. This dock is considerably larger than the previous one, being capable of taking craft 370 feet long or slightly more and has caused marine work, particularly work on the submarines based at Coco Solo, to migrate from Balboa to Cristobal.

A total of 122 vessels was drydocked during the year—82 at Balboa and 40 at Cristobal, as compared with 117 during the preceding year (69 at Balboa and 48 at Cristobal). These vessels are classified as follows:

Class of vessel	Balboa	Cristobal	Total
Panama Canal equipment.....	24	3	27
U. S. Navy vessels.....	19	14	33
U. S. Army vessels.....	1	5	6
Other U. S. Government vessels.....	1	1	2
Panama Railroad vessels.....	1	4	5
Commercial vessels.....	36	13	49
Total.....	82	40	122

Work for the mechanical division continues to decline, being 15 percent less during the fiscal year 1934 than for the preceding fiscal year and less than any of the last eight fiscal years. Marine work constitutes the major source of revenue for the division, being 64.27 percent of the work completed during the past year and the percentage was approximately the same during the two preceding years.

Repairs to commercial vessels consist principally of urgent running repairs to vessels transiting the Canal or calling at Cristobal.

Annual dockings and minor overhauls were completed at Balboa on the steamships *Manizales*, *Iocoma*, and *Neuvo Panama* and on the cable ship *All America*. The Standard Oil tanker *Standard* arrived at Balboa December 4, 1933, after striking the west bank of the Canal while in transit November 22, 1933. Her cargo was transferred to another tankship, her tanks freed from gas, and she was placed in drydock at Balboa. Five shell plates were renewed and 8 removed, faired, and replaced and on December 13, 1933, 9 days later, the vessel was ready to continue her voyage. The Hapag-Lloyd motorship *Cerigo* was drydocked at Balboa after grounding at the approach to Cartagena and 4 shell plates were renewed; 8 were removed, faired, and replaced, and 15 were faired in place. The Norwegian tankship *Strostadt* arrived at Balboa November 27, 1933, with the after section of her starboard main engine crank shaft broken. It was found necessary to completely dismantle the starboard engine; forge, machine, and install two new journals and one new crank pin; remetal all main bearings; completely machine the crank shafts, including turning the crank pins, and realign and rebuild the engine. This was all completed and machinery trials successfully held within 30 days. Other extensive main engine repairs were completed on the steamships *Dorothy Cahill* and *Sidney M. Hauptman*. On the former a new low-pressure piston was cast and machined and a new low-pressure rod forged and machined; the low-pressure and intermediate-pressure cylinders were rebored and miscellaneous repairs were made to the remainder of the engine.

Naval vessels.—Work was performed at the Balboa and Cristobal shops for the United States Navy during the year to a total cost of \$466,489.89 or \$203,026.29 less than during the year preceding, which was the heaviest year of record in this respect. At the Cristobal shops 6 submarines, 1 Navy houseboat, and 3 barges were drydocked and overhauled in addition to miscellaneous repairs to other pieces of floating and miscellaneous equipment. At the Balboa shops 7 submarines, 3 minesweepers, 2 subchasers, the U. S. S. *Richmond* and *J. Fred Talbott*, and 2 miscellaneous craft were drydocked and overhauled. Urgent voyage repairs were also made on the U. S. S. *Indianapolis*, *Overton*, *Sturtevant*, *J. Fred Talbott*, *Jacob Jones*, *Nokomis*, and *Hannibal*. The Navy fleet landing was rigged and unrigged for the Fleet's visit and transit through the Canal on its way to the east coast in April 1934.

Army vessels.—At Balboa shops annual overhauls were accomplished on the mine planter *Graham*, the Commanding General's launch *Q-2*, distribution boat *L-55*, and launch *Winslow*. Miscellaneous urgent repairs were made on the transport *Meigs*, mine yawl *M 108*, launch *Cozy*, and U. S. dredge *Savannah*, the latter being

in transit to the west coast of the United States. At Cristobal shops annual overhauls were performed on the mine planters *Getty* and *H. C. Schumm*, and on the motorship *General Morgan Lewis*. In addition, work of a minor character was performed on various other pieces of Army equipment from time to time.

Foreign government vessels.—At Balboa shops the Peruvian cruisers *Almirante Grau* and *Lima*, and destroyer *Teniente Rodriguez* and four submarines were drydocked and given their annual overhaul. Repairs to a main engine cylinder liner and to a circulating pump were accomplished on the Spanish Naval Training Ship *Juan Sebastian Elvano* and minor repairs were made on the Canadian cruisers *Skeena* and *Vancouver*. The Colombian destroyer *Antioquia* was drydocked on her arrival in these waters for repairs to propellers and her bottom was cleaned and painted.

OTHER WORK

Floating equipment of the marine and dredging divisions of the Panama Canal were given the usual overhauling, the principal jobs being on five 1,000-yard barges, suction dredge *Las Cruces*, dipper dredge *Gamboa*, the two ferryboats, floating cranes *Ajax* and *Her-cules*, and tugs *Mariner*, *Gorgona*, *Engineer*, and *Favorite*. A 1,000-yard dump scow was built and launched at the Balboa shops for the dredging division and the new craneship *Atlas* was completed and put into service. Emergency and operating repairs in large numbers were undertaken for the contractors at Madden Dam and a variety of work was performed for the Panama Canal for use at the dam. Some work was done in anticipation of the 1935 over-haul of the Atlantic Locks. In connection with the construction of concrete Wharf No. 15 at Cristobal out of National Recovery Act funds steel caissons to the value of \$42,374.27 were manufactured at Cristobal shops. The rebuilt Cristobal drydock was placed in use December 13, 1933, from which time, to the close of the fiscal year, 39 vessels were docked in it. National Recovery Act funds were allotted for the construction to part length of an 800-foot concrete pier at Cristobal known as "Pier No. 15." These funds permitted the construction of 475 feet and it is hoped to secure funds for the completion of the remaining 325 feet. Only a small foundry building remains to be completed for finishing the rebuilding of the Cristobal shops.

FINANCIAL

The total expenditures of the mechanical division amounted to \$2,616,004.14, which is \$3,252.50 less than the preceding year. The total amount earned by the division during the year was \$123,523.38.

Local reserves at the end of the fiscal year for repairs to buildings and equipment and for replacements of machinery and equipment, improvements to Cristobal shops, and gratuity for employees' leave totaled \$418,661.35 as compared with \$650,545.59 at the end of the fiscal year 1933.

ELECTRICAL WORK

The principal activities of the electrical division are the operating and maintaining of the hydroelectric and Diesel electric power plants, substations, transmission lines, and power distribution systems; the operation and maintenance of telephone, telegraph, fire alarms, and railway signal systems; the operation and maintenance of Gatun spillway, and the installation and maintenance of such electrical equipment by other divisions of the Panama Canal, other departments of the Government, or such commercial vessels as may require electrical work performed while transiting the Canal or calling at the terminal ports. The total expenditure of the division for the year was \$1,139,838.74, which included \$469,492.51 for maintenance and operation of the power system; \$533,435.78 for construction and maintenance; \$102,350.01 for the maintenance and operation of the telephone system; and \$34,560.44 for the maintenance and operation of the railway signal section.

The power system was operated throughout the year with a generator output of 68,994,100 kilowatt-hours, as compared with an output of 73,517,569 kilowatt-hours during the year preceding; 62,986,352 kilowatt-hours were distributed during the year as compared with 66,172,012 kilowatt-hours during the year preceding. There was a transmission and distribution loss of 6,007,748 kilowatt-hours, or 8.71 percent as compared with a similar loss of 7,345,557 kilowatt-hours, or 9.9 percent during the preceding year. There were 8 interruptions to transmission lines during the year as compared to 15 the previous year. Three of these failures were caused by lightning, 4 by animals climbing the towers, and 1 was by a broken ground wire. During the year the old manually operated Gatun substation was abandoned and power is now furnished to the locks and the townsite substation direct from the hydroelectric station at Gatun. Power for other system substations is transmitted across Gatun Dam and Locks to the trans-Isthmian lines. The abandonment of the old substation resulted in a write-off of \$663,063.56 from the capital account of the power system. The new installations, together with the value of equipment moved from the old substation, represent a value of \$246,749.64, and the power system capitalization has therefore been reduced by \$416,317.12. The

abandonment of the old station also results in the saving of approximately \$20,000 annually in operating expenses.

Some of the more important items of work during the year were the wiring in fixture installation necessary to convert the old nurses' quarters at Colon Hospital into a dispensary and the old dispensary into a hospital ward and private rooms; the completion of a new 72-apartment bachelor quarters building in the Fort de Lesseps area; the completion of the necessary interior wiring and fixtures and the exterior underground distribution for 8 family quarters at Gatun; and 10 family quarters in the Gorgas Hospital area; the installation of some 30,000 feet of a type of cable new on the Isthmus between the Gatun hydroelectric station and the new switching station; the installation of a new cable between Mount Hope and the Coco Solo submarine base for the purpose of providing duplicate electric service to important Navy activities in that area.

A total of 351 jobs was completed in the marine electric shop, the most important being the complete electrical installation on the new crane boat *Atlas* for the Panama Canal; the complete overhaul of the electrical equipment on the U. S. S. *Mallard*, and seven submarines for the United States Navy, and a minor circuit overhaul on the dredge *Las Cruces*.

Installation of electric ranges and water heaters in Panama Canal quarters was continued throughout the year and at the end of the year there were 117 of the 2-burner type, 1,764 of the 4-burner type, and 6 of the 6-burner type.

PURCHASES AND INSPECTIONS IN THE UNITED STATES

The principal purchases of supplies for the Panama Canal have been made by the Washington office, as heretofore. Branch offices in charge of assistant purchasing agents have been continued at New York and San Francisco. While these offices have not been called upon to make many purchases for the Panama Canal during the present fiscal year, they have acted as receiving and forwarding agencies for materials purchased by the Washington office for forwarding to the Isthmus through their respective ports. The office of assistant purchasing agent at New Orleans was abolished during November 1933, and arrangements made with the assistant freight traffic manager of a steamship organization in that city having regular sailings between New Orleans and the Isthmus to act for the Panama Canal as receiving and forwarding agent in connection with material and supplies delivered at and through the port of New Orleans for transshipment to the Isthmus. The Panama Canal medical section, New York General Depot, United States Army, Brooklyn, N. Y., has continued as heretofore, to make purchases of the principal medical and hos-

pital supplies used by the Panama Canal on the Isthmus, these purchases being made upon requests from the Washington office based on requisitions received from the Isthmus.

The force of inspectors in the field, under the supervision of the inspecting engineer located at Washington, has been continued as in the past for the purpose of making preliminary inspection of materials in the United States covering purchases where delivery is required on the Isthmus, and also for making final inspection of materials where delivery is made in the United States. The large majority of purchases are, however, made for delivery on the Isthmus in accordance with the long-established policy of permitting competition for the Canal's requirements on even terms in all sections of the country. As in the past, the field officers of the Corps of Engineers, United States Army; the Bureau of Standards; the Bureau of Mines; the Bureau of Chemistry of the Department of Agriculture; the Medical Department, United States Army; and the Bureau of Construction and Repair and the Bureau of Engineering, Navy Department, have assisted in connection with the inspection work in the United States. The total number of orders placed during the fiscal year was 6,761, being a decrease of 471 as compared with the fiscal year 1933, or 6.5 percent.

The total value of orders placed in the Washington office during the year was \$3,201,636.97 as compared with \$3,612,438.70 for 1933, a decrease of \$410,801.74. These totals do not include the amount covered by orders placed by the medical section, New York General Depot, United States Army, Brooklyn, nor orders placed by the assistant purchasing agents at New York and New Orleans, which together amounted to \$51,732.22 during the fiscal year 1934. The grand total for the purchase of supplies and materials covered by orders placed in the United States by and under the direction of the Washington office from 1904 to the end of the fiscal year 1934 was \$224,713,880.11.

The sale of surplus Canal material by the purchasing department in Washington during the fiscal year amounted to \$74,000.37.

The special conditions of the National Industrial Recovery Act and Executive orders issued thereunder have been strictly adhered to, and special care was exercised in the making of awards to be sure that bids in all cases conformed to the requirements of the various codes established in connection with the National Industrial Recovery Act.

The assistant auditor's office in Washington prepares vouchers for payments to be made in the Washington office; keeps records relative to payments and financial transactions; conducts correspondence relative to payments of claims; has charge of collections; examines and

approves transfer settlements; gives the disbursing clerk's accounts an administrative examination before submission to the General Accounting Office, Audit Division; prepares statistical data required to show distribution of expenses of the Washington office; prepares reports on claims submitted to the General Accounting Office, Claims Division, for settlement; prepares contracts and bonds; has charge of work in connection with deposits for tolls made with Federal Reserve banks; and passes upon legal questions involved in the transactions of the business of the Washington office of the Panama Canal. During the year 9,287 disbursement vouchers, amounting to \$4,150,727.31, and 267 collection vouchers, amounting to \$167,556.66, were prepared. In addition to the collection vouchers, 19 collections, amounting to \$40,275.54, were made by transfer of appropriation through the General Accounting Office, making the total amount collected \$207,832.20 on 286 different accounts, an increase of \$72,484.03 as compared with the previous fiscal year.

During the year 53 contracts were prepared, amounting to \$1,576,002.62, representing an increase of 16 contracts over the previous year and a decrease of \$213,968.72 in amount.

SHIP CHANDLERY AND OTHER STOREHOUSE SUPPLIES

The operation of the storehouses was continued under the same general policy as during the preceding year. The book value of stock on hand at all storehouses at the end of the year was \$3,488,060.69. The total value of all materials received on requisition from the United States was \$4,071,828.85. Local purchases were made during the year to the extent of \$308,208.55. Scrap and obsolete stock remaining on hand at the end of the year were valued at \$48,002.52. Among the sales of scrap during the year was that of 8,747 net tons of American scrap iron, of which 107 tons were sold in the local market.

The general storehouse at Balboa, including the medical storehouse, and the branch storehouse at Cristobal and the one at Paraíso handled a total of 131,333 requisitions and foremen's orders during the year. The value of all issues for the year was \$4,315,507.44. Material and supplies sold to steamships, employees, and others aggregated \$644,860.49 and involved 82,640 separate sales. The sales to steamships amounted to \$28,165.99, involving 1,595 sales.

Native hardwood lumber operations were continued and during the year 329,960 board-feet of logs were purchased from local contractors.

Cement issued during the year amounted to 402,462 barrels, of which 347,239 were for the Madden Dam.

For the year's operations, revenues exceeded expenditures by \$95,-999.70 (see table 26, sec. V).

FUEL OIL, DIESEL OIL, GASOLINE, AND KEROSENE

Fuel and Diesel oil.—All deliveries to and from the tanks, for private companies as well as for the Panama Canal and the United States Navy, are handled through the pipe lines and pumping plants of the Panama Canal. The total fuel and Diesel oil handled by the Balboa and Mount Hope plants, including both receipts and issues, aggregated 9,710,246 barrels, as compared with 6,022,663 in the preceding year. The operations are shown in more detail in the following tabulation:

	Balboa	Mount Hope	Total
Received by the Panama Canal.....	<i>Barrels</i> 89,932.81	<i>Barrels</i> 224,785.05	<i>Barrels</i> 314,717.86
Used by the Panama Canal.....	135,168.45	244,629.39	379,797.84
Pumped for individuals and companies.....	3,300,845.02	5,639,670.51	8,940,515.53
Sold by the Panama Canal.....	2,944.34	9,841.91	12,786.25
Miscellaneous transfers.....	22,036.79	40,392.29	62,429.08
Total receipts, deliveries, and transfers.....	3,550,927.41	6,159,319.15	9,710,246.56

The number of ships discharging or receiving fuel oil (including Diesel oil) during the year totaled 1,724, of which number 60 were Panama Canal craft.

Gasoline and kerosene.—Bulk gasoline and kerosene received on the Isthmus during the year totaled 3,029,230 and 993,290 gallons, respectively.

Storage facilities.—No changes in volume of storage facilities were made during the year and they remained as follows:

	Balboa	Mount Hope	Total
Fuel and Diesel oil.....barrels.....	1,209,540	1,194,500	2,404,040
Gasoline and kerosene.....gallons.....	4,807,000	2,263,000	7,070,000

Revenue exceeded expenses by \$197,460.18 for the year (sec. V, table 26).

OBSOLETE AND UNSERVICEABLE PROPERTY AND EQUIPMENT

During the year disposition was made of \$410,499.44 worth of obsolete or unserviceable property and equipment by sale, or by destruction where the items had no money value. Replacement was made in all cases where conditions warranted.

BUILDING CONSTRUCTION AND MAINTENANCE

The principal projects of building construction completed during the year consisted of 10 two-family houses, Gorgas Hospital area, Ancon; 7 two-family houses and 1 cottage at Gatun; concrete 28-apartment bachelor quarters building, De Lesseps area, Colon; concrete and frame 72-room bachelor quarters building, Old Cristobal; new property and equipment shed, Balboa Heights; new Panama Railroad yard office building, Balboa; and new pump and compressor buildings, Cristobal shops.

The principal projects under construction at the end of the fiscal year were one quarters building, official type, Colon Beach; high school and junior college, Balboa; gasoline filling station, Cristobal; and raising of 31 cottages in Balboa-Ancon district and installing garages underneath.

TERMITES

Preventive measures which have been carried on for the past several years to prevent the destruction of frame buildings by termites were continued throughout the year. In the raising of 31 cottages in the Ancon-Balboa district for the purpose of installing garages underneath, termite proofing will be provided by placing metal plates between the new concrete posts and the frame superstructures.

It is apparent that the intensive efforts made during the past several years to eliminate termites from wooden buildings is resulting in a large reduction of the damage formerly done by them and a consequent saving of maintenance expense.

QUARTERS FOR EMPLOYEES

Gold employees.—Due to the completion of new houses authorized last year, reduction in working force, retirement of employees, etc., at the end of the year, the number of quarters available fell only a little short of meeting the demand. However, a large number of families are quartered in old wooden houses where expenditures for further maintenance is false economy. This is particularly true at Gatun, where only 15 new family apartments have been constructed since 1906 and 1907. There are still about 135 old family apartments and about 30 old bachelor apartments at Gatun that should be replaced as soon as funds can be made available. At Cristobal there remain approximately 115 family apartments built in 1906 and 1907 that should be replaced. At Ancon there are approximately 225 family and 400 bachelor apartments that should be replaced; at Pedro Miguel 130 family apartments and 60 bachelor apartments. All of the above are 1906 and 1907 construction.

On June 30, 1933, there were 18 accepted applications on file for family quarters in all districts, and on June 30, 1934, there were 33 applications on file—an increase of 15 over the previous year. Those on file June 30, 1934, were distributed as follows: Ancon-Balboa district 13, Cristobal district 18, Pedro Miguel district 2. All quarters were maintained in as good condition as available funds would permit.

A few old frame quarters were disposed of by sale or demolished to provide sites for new buildings. During the year 18 family quarters consisting of 35 apartments, 1 twenty-eight apartment bachelor quarters building, and 1 seventy-two room bachelor quarters building were constructed and occupied. Rentals collected exceeded expenses of maintenance and reserves set aside for depreciation by \$572.03 (sec. V, table 26).

Silver employees.—The demand for quarters from employees on the silver roll is still far in excess of the supply. The present policy, however, is not to increase appreciably the total of apartments but to confine the work primarily to maintenance and replacement. At the close of the fiscal year the accepted applications on file for silver quarters totaled 1,324, distributed as follows: Ancon-Balboa district, 831; Cristobal, 396; Pedro Miguel, 64; and Gatun, 33. Over 50 percent of the force of silver employees are required to live in Panama City and Colon, where rental rates are considerably higher than those charged by the Panama Canal. The \$95,000 appropriated heretofore by Congress to cover the deficit in silver quarters operations after revenues had been applied against expenses was eliminated for the fiscal year 1934, necessitating severe curtailment of maintenance work on such quarters.

MOTOR AND ANIMAL TRANSPORTATION

Motor and animal transportation for all departments and divisions continued to be supplied by the transportation division under the pool system. This division is charged with operation and maintenance of all transportation equipment and is required to operate on a self-sustaining basis. The usual amount of heavy hauling in connection with various building projects was accomplished during the year.

During the year 23 cars and trucks were retired and only 1 new unit was purchased, in line with the policy of enforcing the utmost economy in all divisions. There were on hand at the close of the year 315 cars and trucks, 4 trailers, 7 motorcycles, 5 mowing machines, and 16 mules. Revenues exceeded expenditures for the fiscal year by \$63,866.69, as compared with a profit of \$24,319.17 for the preceding year.

THE PANAMA CANAL PRESS

The operations of the Panama Canal Press were continued under the same policy as in previous years. At the beginning of the fiscal year 1934 the Canal Record was changed from a weekly to a monthly publication. The plant carries in stock and manufactures such necessary stationery, forms, etc., as are required on the Isthmus in connection with the operation of the Panama Canal and the Panama Railroad. The manufacturing output for the current year amounted to \$144,985.09, as compared with \$154,523.54 for the previous year. The excess of revenues over expenditures was \$33,131.34 for the year. The annual inventory value of material on hand at the close of the year was \$59,617.64, as compared with \$59,323.62 for the previous year.

REVENUES DERIVED FROM THE RENTAL OF LANDS IN THE CANAL ZONE

Rentals on building sites and oil-tank sites in the Canal Zone totaled \$45,166.50 for the year, as compared with revenues of \$49,-337.25 in 1933. Rentals on agricultural lands in the Canal Zone totaled \$19,397.44, as compared with \$20,330.79 for the preceding year.

At the close of the fiscal year a total of 1,611 licenses were in effect covering 3,637 hectares of agricultural land within the Canal Zone. This is a reduction of 139 in the number of licenses, as compared with the close of the preceding fiscal year, and a reduction in the area held under licenses of 541½ hectares.

EXPERIMENTAL GARDENS

Work in these gardens was continued along the same general lines as in former years, although the very limited funds available have not permitted the introduction of plants or plant experimentation with the same activity as for previous years. Plant exchanges were carried on with experimental stations, botanical gardens, and individuals in different parts of the world, and many valuable plants were disseminated throughout the Canal Zone, the Republic of Panama, and the surrounding countries.

During January of this year the director of the gardens visited Chiriquí Province in the Republic of Panama for the purpose of inspecting plants which the gardens have planted there for experimental purposes and making further plantings under varying environmental conditions.

During the present year an opportunity was afforded the Government of Panama to supply a number of young men to be trained in the work of planting, budding, grafting, and other horticultural

operations at the gardens. The Department of Agriculture of the Republic of Panama cooperated in this plan and a group of young men was selected and after about 6 months' training in this work they had gained considerable valuable experience and most of them were given positions with the Panamanian Government in connection with the extension service maintained by that Government.

BUSINESS OPERATIONS UNDER THE PANAMA RAILROAD COMPANY

Many of the business activities on the Isthmus connected with the operation of the Canal are conducted with funds of the Panama Railroad Co. Included in these are the wharves and piers at the harbor terminals, the commissary system, coaling plants, hotels, and various minor activities, as well as the Panama Railroad itself. In this report only the major features of these operations are noted in their relation to the Canal administration as a whole. Details are given in the annual report of the Panama Railroad, which is published separately.

The operations of the railroad proper, harbor terminals, coaling plants, stables, and baggage transfer were continued throughout the year under the direction of the general manager of the railroad; the telephone system under the electrical engineer of the Panama Canal; renting of lands and buildings under the land agent; and the commissaries, hotels Washington and Tivoli, plantations, dairy farms, and cattle industry under the chief quartermaster of the Panama Canal.

Business operations on the Isthmus, carried on with Panama Railroad funds, yielded a profit of \$1,156,738.14 for the fiscal year, as compared with \$784,432.28 in 1933, an increase of \$372,305.86, or 47.5 percent.

A summary of 1934 operations is given in the paragraphs following:

RECEIVING AND FORWARDING AGENCY

Harbor terminals.—The gross revenue from harbor terminal operations during the fiscal year amounted to \$1,401,558.65; operating expenses were \$1,042,021.42, leaving a net revenue of \$359,537.23, as compared with \$357,451.86 in 1933.

There were 1,597,324 tons of cargo stevedored and transferred, as compared with 1,357,369 tons in 1933, an increase of 239,955 tons. During the year 4,329 cargo ships and 941 banana schooners were handled, as compared with 3,593 cargo ships and 900 banana schooners in 1933. Agency service was furnished to 195 commercial vessels, as compared with 197 last year.

Canal Zone for orders.—As an aid in the distribution of goods to areas served by steamship lines using the Panama Canal or its terminal ports, there was established in 1925 the arrangement known as "Canal Zone for orders." Under this system merchandise is shipped to Canal Zone ports (Cristobal or Balboa) to be held there in warehouses of the Panama Railroad Co. for orders. Such cargo or integral parts of it may be withdrawn and delivered locally or forwarded as the consignor or consignee may desire, except that goods for use in the Canal Zone or the Republic of Panama, by other than those entitled to free-entry privileges, are released only upon the presentation of satisfactory evidence of payment of the proper duty to the Republic of Panama. Many different commodities were handled in this manner during the year; the total cargo received under the arrangement was 6,069 tons. This was a decrease of about 44.7 percent from the tonnage received during the previous year. The revenue received for handling and storage amounted to \$18,882.40, as compared with \$28,033.91 for 1933, a decrease of \$9,151.51.

COMMISSARY DIVISION

The operation of the commissary division continued along the same general lines as during the past year. Every effort was made to restrict sales in the commissaries to those authorized and entitled to purchase. The majority of infractions were of a minor nature and were promptly corrected. The agreement between Presidents Roosevelt and Arias imposed specific restrictions on sales to commercial vessels, and reemphasized the necessity of applying the restrictions on sales generally.

The total gross receipts were \$6,508,285.66, as compared with \$7,313,380.84 for 1933, a decrease of \$805,197.49. The monthly average sales amounted to \$542,357.14, as compared with \$609,448.40 for the preceding fiscal year.

The inventory of merchandise on hand at the close of the fiscal year was \$1,561,350, as compared to \$1,670,000 at the close of the fiscal year 1933. The ratio of sales to inventory indicates a theoretical stock turn-over every 2.88 months.

The cost of sales, including operating expenses, was \$6,257,836.45, resulting in a net profit of \$250,346.90, as compared with \$224,876.58 for the preceding year, an increase of \$25,470.32.

Sales.—The distribution of sales as compared with the two preceding years was as follows:

	1932	1933	1934
United States Government (Army and Navy).....	\$1,069,871.40	\$964,376.75	\$664,593.94
The Panama Canal.....	626,585.66	562,851.24	496,083.02
The Panama Railroad.....	236,825.73	180,451.53	234,266.73
Individuals and companies.....	527,791.93	493,475.57	406,556.18
Commercial ships.....	458,943.30	294,416.69	330,570.82
Employees.....	5,768,104.96	5,107,704.11	4,654,620.74
Total sales.....	8,688,122.98	7,603,275.89	6,786,691.43
Less discounts, credits, etc.....	340,896.65	289,895.05	278,508.05
Net revenue from sales.....	8,347,226.33	7,313,380.84	6,508,183.35
Supplies for expenses:			
Retail commissaries and warehouses.....	41,796.53	33,971.25	38,404.70
General.....	2,623.87	1,640.31	2,276.22
Plants.....	26,016.66	21,679.97	23,328.41
Total.....	70,437.06	57,291.53	64,009.33
Lost by condemnation, pilferage, shrinkage, clerical errors, etc.....	135,304.27	105,536.52	77,922.59
Grand total.....	8,552,967.66	7,476,208.89	6,630,115.27

Purchases.—Purchases during the year aggregated \$4,435,528.82, a decrease of \$414,800.48, or 8.55 percent, as compared with the previous year. The following tabulation shows the value of the various classes of materials purchased, and the market in which purchased, as compared with the 2 preceding years:

	1932	1933	1934
Groceries.....	\$1,305,899.68	\$1,234,567.33	\$1,253,372.31
Candy and tobacco.....	350,346.83	307,226.56	324,182.64
Hardware.....	427,776.78	337,195.27	260,035.89
Dry goods.....	888,311.14	764,973.11	624,581.16
Shoes.....	191,066.02	146,378.30	161,987.18
Cold storage.....	1,213,423.68	1,092,113.73	922,678.32
Raw material.....	427,159.61	318,784.87	340,647.14
Cattle and hogs.....	261,507.06	124,465.53	9,217.64
Milk and cream.....	164,719.51	153,383.45	131,058.85
Dairy products.....	327,179.21	371,241.15	407,767.69
Total.....	5,587,389.52	4,850,329.30	4,435,528.82
Place of purchase:			
United States.....	4,192,222.93	3,798,356.49	3,569,568.40
Europe and Orient.....	621,423.42	482,590.29	472,386.34
Central and South America.....	145,085.99	131,284.11	101,261.13
Local.....	167,199.81	130,894.20	104,353.12
Panama Canal.....	69,947.45	70,558.68	67,445.14
Cattle industry.....	391,509.92	236,646.13	120,514.69
Total.....	5,587,389.52	4,850,329.30	4,435,528.82

Manufacturing plants.—The output of the various manufacturing plants and laundry during the year had a total value of \$1,095,201.90, as compared with \$1,506,092.22 for the preceding year, a reduction of \$410,890.32, or 27.3 percent. The principal products of the major plants and their value are as follows:

The output of the bakery included 4,317,454 loaves of bread, 1,524,056 rolls, 265,270 pounds of soda crackers, 57,394 dozen cookies (formerly carried as pounds of crackers), together with cakes, pies, doughnuts, roasted almonds, etc., to the total value of \$245,320.11.

The coffee-roasting plant turned out 214,136 pounds of coffee, 26,087 pounds of cornmeal, 11,083 pounds of roasted peanuts, to the total value of \$52,791.78.

The amount of ice manufactured during the year was 25,411½ tons, valued at \$182,949.86.

The principal output of the ice-cream and milk-bottling plant consisted of 760,316 quarts of milk, 67,786 gallons of ice cream, and 9,602 quarts of cream. The combined value was \$233,605.80.

The value of items manufactured in the industrial laboratory totaled \$200,165.92.

The abattoir and pickling department turned out 168,669 pounds of dressed beef, 10,955 pounds of lobster, and 21 turtles, to the value of \$13,467.56. Abattoir byproducts shipped to the United States consisted of hides, horns, etc., and were valued at \$2,233.30.

The number of pieces of laundry handled was 4,408,619, and receipts aggregated \$166,900.87.

HOTELS AND RESTAURANTS

The hotels Tivoli and Washington, at the two ends of the Canal, are operated as essential adjuncts to the Canal for the purpose of providing suitable accommodations to people having business with the Canal, foreign visitors, tourists, visiting Government officials, and others. The cost of operating the Hotel Tivoli during the year was \$144,869.61, which was \$12,768.32 more than the revenue derived. The operating cost of the Hotel Washington during the year was \$130,742.97, which was \$23,719.17 more than the revenue derived. Operating expenses of both hotels include increases in unexpended reserves over last year, as follows: Tivoli, \$7,456.16; Washington, \$14,433.11.

The restaurants and silver messes were operated under contract until the close of business May 15, 1934, when the contract was terminated and restaurant operations turned over to the bureau of clubs and playgrounds, which organization was already serving light meals and selling tobaccos. The concrete restaurant buildings at Ancon and Cristobal will be occupied by the clubhouse activities; the one at Balboa will be utilized as a central police station, magistrate's court, and jail; and the one at Pedro Miguel will be used to house the post office and the district quartermaster's office.

CATTLE INDUSTRY

Beef cattle.—During the year 250 head of fat steers were purchased for the commissary division from cattle firms in the Republic of Panama in addition to 34 head of cattle delivered by the cattle

industry pastures during the year. The operations for the year resulted in a net loss of \$9,500.95, as compared with a profit of \$4,056.46 the year preceding. No beef cattle was on hand at the close of the year.

Dairy farm.—The total milk production at the Mindi dairy amounted to 243,551 gallons, or an increase of 34,999 gallons over the preceding year. No new dairy stock was purchased during the year, and a total of 785 head were on hand as of June 30, 1934, as compared with 751 head the year before. The year's operations resulted in a net profit of \$6,271.01, as compared with \$12,419.62 for the fiscal year 1933.

PANAMA RAILROAD CO. LANDS AND LEASES

At the close of the fiscal year 1,445 leases and 15 licenses were in effect covering the use of Panama Railroad properties in the cities of Panama and Colon. The income derived by the Panama Railroad from these leases and licenses amounted to \$234,900.94, representing a decrease in revenue over the previous year of \$48,774.76.

The decrease in revenue was largely due to a discount of 33 $\frac{1}{3}$ percent given to all lessees who were paying the full commercial rental and who paid their accounts during the period for which bills were rendered. This reduction in rental, amounting to \$76,404.72, was given as a relief measure due to depression in business and consequent reduction in earnings on real estate.

Fifteen new leases and 3 revocable permits were issued during the fiscal year and 5 leases canceled.

During the fiscal year two properties in the city of Panama, having an area of 722.32 square meters, were sold for \$12,463.10.

TELEPHONES AND TELEGRAPHS

The gross revenue from the operation of telephones, electric clocks, and electric printing telegraph machines amounted to \$238,693.09, and the total expenses were \$173,883.57, leaving a net revenue of \$64,809.52, as compared with \$56,278.97 for the preceding year, or an increase of \$8,530.55 for the year.

During the year 1,213 telephones were installed and 1,270 were discontinued, making a net decrease of 57 telephones for the year. At the end of the fiscal year the telephones on the system numbered 2,709, as compared with 2,766 at the end of the previous year.

A total of 24 automatic printing telegraph typewriters were in use at the end of the year, 12 in use by the Panama Canal and 12 by commercial enterprises. Electric clocks in service at the end of the year numbered 59, a decrease of 5 as compared with the previous year. Twenty Morse telegraph stations were in service throughout the year.

COAL

The sale of coal from the plants at Cristobal and Balboa totaled 52,657 tons, as compared with 39,327 tons in 1933, an increase of 13,330 tons, or approximately 34 percent. Purchases during the year totaled 31,140 tons. Total revenue from the sale of coal and the extra charges for handling was \$388,387.83. The cost of sales, including operating expenses, was \$299,696.22, resulting in a net profit of \$88,691.61, as compared with a loss of \$70,777.95 last year.

August 1, 1933, the price of coal at Cristobal was increased from \$6.25 to \$7.25 per ton, with a corresponding increase at Balboa. December 1, 1933, the price was reduced to \$6.75 at Cristobal and \$9.75 at Balboa. Due to increased purchase price in the United States the selling price on the Isthmus was increased May 10, 1934, to \$7.75 at Cristobal and \$10.75 at Balboa.

The operating expenses of the coaling plants were decreased from \$111,317.78 in 1933 to \$69,313.49 in 1934.

THE PANAMA RAILROAD

The gross revenues during the fiscal year 1934 from the operations of the Panama Railroad proper (not including subsidiary business activities) amounted to \$1,418,432.73. The operating expenses were \$1,131,413.56, leaving a net revenue of \$287,019.17 for the year, as compared with \$123,924.62 last year, an increase of \$163,094.55.

Tonnage of revenue freight transported during the year amounted to 296,247, as compared with 292,525 in 1933, an increase of 3,722 tons.

Statistics covering the various features of railroad operations during the past 3 years are presented in the following table:

	1932	1933	1934
Average miles operated, Colon to Panama	47.61	47.61	47.61
Gross operating revenue	\$1,433,719.13	\$1,328,229.81	\$1,418,432.73
Operating expenses	\$1,377,130.33	\$1,204,305.19	\$1,131,413.56
Net operating revenue	\$56,588.80	\$123,924.62	\$287,019.17
Percent of expenses to revenue	96.05	90.66	79.77
Gross revenue per mile of road	\$30,113.82	\$27,898.12	\$29,729.75
Operating expense per mile of road	\$28,925.23	\$25,295.21	\$23,764.20
Net revenue per mile of road	\$1,188.59	\$2,602.91	\$6,028.55
Number of passengers carried:			
First class	184,307	168,344	162,501
Second class	225,647	194,765	196,597
Total	409,954	363,109	359,098
Revenue per passenger-train mile	\$4.17	\$3.88	\$3.76
Revenue per freight-train mile	\$9.66	\$9.47	\$11.83
Total revenue-train mileage	193,667	186,598	183,143
Railroad revenue per train mile	\$7.40	\$7.12	\$7.74
Railroad operating expense per revenue-train mile	\$7.11	\$6.45	\$6.18
Net railroad revenue per revenue-train mile	\$0.29	\$0.67	\$1.57
Freight, passenger, and switch locomotive mileage	307,539	282,502	280,358
Work-train mileage	5,116	11,266	6,318
Passenger-train mileage	111,592	108,257	111,076
Freight-train mileage	82,075	78,341	72,067

PANAMA RAILROAD STEAMSHIP LINE

The gross operating revenue for the steamship line for the fiscal year ended June 30, 1934, amounted to \$953,444.98, and the gross operating expenses amounted to \$1,273,007.12, resulting in a net deficit from operations of \$319,562.14. The operating deficit compared with the net loss for the fiscal year ended June 30, 1933, of \$320,484.65, shows an increase in the net revenue of \$922.51.

For the year ended June 30, 1934, the tonnage carried by the steamship line amounted to 118,606 tons, as compared with 116,148 tons in the previous year.

The steamship line carried freight and passengers for account of the Panama Canal and other departments of the Government of the United States at material reductions from tariff rates, which amounted to the important sum of \$470,591.64. Had regular tariff rates been received by the steamship line for such freight and passenger services performed for the Panama Canal and other Government departments its income would have been increased by \$470,591.64 and its operations for the year would have resulted in a profit of \$151,029.50.

SECTION III

ADMINISTRATION

DEPARTMENTS

The organization of the Panama Canal on the Isthmus embraces five principal departments, namely: Operation and maintenance, supply, accounting, executive, and health. An office is maintained in Washington, D. C., and the Panama Railroad Co. is so closely affiliated as to be practically a part of the organization.

OPERATION AND MAINTENANCE

The department of operation and maintenance embraces functions related to the actual use of the Canal as a waterway, including the dredged channel, locks, dams, and aids to navigation, accessory activities such as shops and drydocks, vessel inspection, electrical and water supply, sewer systems, roads and streets, hydrographic observations, surveys and estimates, and miscellaneous construction, other than the erection of buildings.

SUPPLY

The supply department is charged with the accumulation, storage, and distribution of materials and supplies for the Canal and Panama Railroad; the operation of commissaries, hotels, cattle pastures, dairy and experiment gardens; the maintenance and construction of buildings; the assignment of quarters and care of grounds; and the sale of provisions and other supplies, except coal and water, to ships. It also operates corrals and motor transportation, manufacturing plants, bakeries, ice plants, abattoirs, printing plant, and other related activities.

ACCOUNTING

The accounting department is responsible for the correct recording of financial transactions of the Canal and Railroad; the administrative auditing of vouchers covering the receipt and disbursement of funds preliminary to the final audit by the General Accounting Office; cost keeping of the Canal and Railroad; the checking of time keeping; the preparation of estimates for appropriations and the allotment of appropriations to the various departments and divisions; and the examination of claims. The collector and the paymaster are attached to the accounting department.

EXECUTIVE

The executive department embraces the general office business of the Governor, administrative activities invested by Executive order within the authority of the executive secretary. Under this department come the administration of police and fire protection, postal service, customs, shipping commissioner work, estates, schools, general correspondence, and records for the organization of the Canal and the Panama Railroad, personnel records, time keeping, wage adjustments, statistics of navigation, information and publicity, relations with Panama, and the operation of clubs and playgrounds.

HEALTH

The health department is charged with all sanitary matters within the Canal Zone and the cities of Panama and Colon, the operation of the hospitals and dispensaries, the enforcement of quarantine regulations, and the compilation of vital statistics for the Canal Zone and in the cities of Panama and Colon.

PANAMA RAILROAD CO.

The operations of the Panama Railroad Co. on the Isthmus are generally related closely to the work of the Canal, and the Railroad organization is in effect a part of the Canal organization. The Governor is president of the Panama Railroad Co.; the heads of departments in the Canal organization and of the Railroad report to him. The general administration of the composite organization is centered in the executive office, and the accounting work in the accounting department; the Panama Railroad and other divisions of the general organization are billed for their proper share of the general overhead work.

CHANGES IN PERSONNEL AND ORGANIZATION

There was no change in organization during the year and but two changes in organization heads as follows:

Col. O. G. Brown, United States Army, was appointed chief health officer June 30, 1934, vice Col. J. F. Siler, United States Army, relieved from duty with the Panama Canal.

Col. Edgar King, United States Army, was appointed superintendent, Gorgas Hospital June 30, 1934, vice Col. O. G. Brown, appointed chief health officer.

Lt. Comdr. Charles F. Osborn, Construction Corps, United States Navy, was appointed assistant to Governor June 19, 1934, in anticipation of his appointment as superintendent of mechanical division on July 2, 1934, vice Capt. R. W. Ryden, Construction Corps, United States Navy, upon relief of the latter from duty with the Panama Canal.

FORCE EMPLOYED

The supervisory, technical, higher clerical, and highly skilled mechanical employees, consisting primarily of citizens of the United States, but including a few others, are employed on what is known as the "gold roll"; the rest of the force, principally aliens, but including a few citizens of the United States, on low-paid work, are designated as "silver" employees. These terms are a heritage from the tropical practice of paying Americans and Europeans in gold because of its stability, while the native or tropical labor was paid in local currency, based on silver.

Based on the last force reports in June of each year the gold force decreased from 3,028 as of June 21, 1933, to 2,934 as of June 20, 1934, a decrease of 94, or 3.10 percent; the silver force decreased from 9,575 to 9,086, a decrease of 489, or 5.11 percent. The combined force changed from 12,603 to 12,020, a decrease of 583, or 4.63 percent. The force report shows all gold employees who were in the service on the date of the report, including those on leave. For silver employees the force report shows only those who were working on the days covered by the report. The silver force is likely to fluctuate sharply, due to seasonal or temporary employment.

GOLD EMPLOYEES

The distribution of the gold personnel on the last force report days of the 2 years is shown in the following tabulation:

Department or division	Gold force		Decrease	Increase	Net decrease
	June 21, 1933	June 20, 1934			
Operation and maintenance:					
Office	45	46	8		
Electrical division	145	144	1		
Municipal engineering division	99	82	17		
Locks division	207	240		33	
Dredging division	163	156	7		
Madden Dam division	65	68		3	
Mechanical division	399	384	15		
Marine division	177	181		4	
Fortifications	12	10	2		
Total, operation and maintenance	1,321	1,311	50	40	10
Supply department:					
Quartermaster	182	192			10
Commissary division	221	201	20		
Cattle industry	2	2			
Hotel Tivoli	7	7			
Hotel Washington	7	5	2		
Transportation	74	62	12		
Total, supply department	493	469	34	10	24
Accounting department					
Health department	187	176	11		
Executive department	276	255	21		
Total, 3 departments	565	548	17		
Panama Railroad:					
General manager	23	23			46
Transportation	77	71	6		
Receiving and forwarding agency	86	81	5		
Total, Panama Railroad	186	175	11		11
Grand total	3,028	2,934	144	50	94

Increases occurred in 4 of the 21 units of the organization, as reported in the foregoing table, and decreases in 14. The increase of 33 in the locks division was necessitated by reason of an act of Congress decreeing a change from the 48-hour week to a 40-hour week. The increase in marine division force was caused by the hiring of additional pilots. An increase of 3 in the Madden Dam division was necessitated by reason of the contractors resuming work on a full 3-shift day. The increase in the quartermaster division of supply department was due to increased building operations and the change to the 40-hour week basis.

Decreases were due to the completion of projects, retirements, or to lessened activities generally resulting from decrease in traffic. The changes in force are not always mathematically proportionate to the changes in business; in lieu of reduction of force, many employees were furloughed at intervals so as to afford part-time employment to as many as practicable and distribute earnings, and in smaller units of the organization no proportionate reduction is practicable.

RECRUITING AND TURN-OVER OF FORCE

The following table shows additions to the gold force and separations from it in the fiscal year from July 1, 1933, to June 30, 1934. Employments are classified as made in the United States or on the Isthmus, and separations are classified by cause. This table covers a slightly different period from that between the force reports of June 21, 1933, and June 20, 1934.

	Operation and main- te- nance	Execu- tive	Supply	Health	Ac- count- ing	Pan- ama R. R.	Total
Employed or reemployed in the United States	31	15		28		1	75
Employed or reemployed on the Isthmus	226	31	81	13	7	39	397
Total additions	257	46	81	41	7	40	472
Resigned	102	38	11	36	4	24	215
Retired:							
Age	15	4	3	2	1	7	32
Disability	16	8	4	5	4	9	46
Involuntary separation	20	1	4	1	1	4	31
Voluntary separation	1	1					2
Died	7	1	1	1		3	13
Reduction of force	62	1	12	5	6	1	87
Expiration of temporary employment	80	7	16	18	2	8	131
Discharged for cause	10	1	3	2	1	4	21
Completion of apprenticeship	4		5				9
Transferred to Department of Justice		10					10
Total	317	72	59	70	19	60	597

The Panama Canal:

Separations	537	The Panama R. R. Co.:	60
Additions	432	Separations	40
Net separations	105	Additions	20

The number of employees retired during the year under the provisions of the Panama Canal retirement act was 111. Of these 46 were retired on account of disability; 9 being Panama Railroad employees. Thirty-two were retired on account of age, 7 of whom were Panama Railroad employees. Voluntary separations numbered 2, and involuntary separations numbered 31, 4 of whom were Panama Railroad employees. Involuntary separations comprise those employees whom it was necessary to let out through reduction of force but who had sufficient service to entitle them to annuities.

The number of persons tendered employment through the Washington office of the Panama Canal, all above the grade of laborer, was 116, of whom 77 accepted and were appointed, covering 22 different kinds of positions. Acceptances and appointments were 66 percent of the tenders, as compared with 73.1 percent last year. The total number of gold employees added to the pay rolls on the Isthmus during the fiscal year by employment or reemployment is reported by the personnel bureau as 472. Separations from the service numbered 597, making a net decrease of 125. Based on a gold force of 3,028 as of June 21, 1933, the 597 separations give a turnover rate of 19.7 percent from all causes. For the fiscal year 1933 the rate was 12.05 percent.

At the end of the fiscal year the applications on file from residents of the Isthmus for employment on the gold roll numbered approximately 1,000.

When a position is to be filled efforts are made to fill it by the promotion of an employee or by the transfer of an employee whose work in another department is about to terminate. This not only reduces the expenses of recruiting new employees but has the further value of strengthening the morale of the force through giving the employees a reasonable expectation of promotion and continued employment as long as their services are satisfactory, thus building up loyalty to the organization. Of the 472 gold employees employed during the past fiscal year, 329, or approximately 70 percent, were reemployments; of these, 306 were reemployed on the Isthmus and 23 in the United States.

During the year arrangements were made for the transportation of 2,419 persons from the United States to the Isthmus. Of this number 2,234 were from New York, 73 from New Orleans, 6 from other Atlantic ports, 101 from Pacific Coast ports, and 5 via air-transport service. These included new appointees and employees returning from leave of absence and members of their families.

SILVER EMPLOYEES

The distribution of the silver personnel on the last force report days of the two years is shown in the following tabulation. The

summary is for the days on which the force report is made. The force may change by several hundred within a short time according to fluctuations in the demand for labor. The summary shows only those actually at work on June 21, 1933, and June 20, 1934:

Department or division	Silver force		Decrease	Increase	Net decrease
	June 21, 1933	June 20, 1934			
Operation and maintenance:					
Office.....	50	52		2	
Electrical division.....	181	190		9	
Municipal engineering division.....	1,053	804	249		
Locks division.....	701	635	66		
Dredging division.....	837	934		97	
Madden Dam division.....	124	115	9		
Mechanical division.....	745	783		38	
Marine division.....	553	548	5		
Fortifications.....	34		34		
Total, operation and maintenance.....	4,278	4,061	363	146	217
Supply department:					
Quartermaster.....	1,438	1,454		16	
Commissary division.....	1,155	1,001	154		
Cattle industry.....	89	84	5		
Hotel Tivoli.....	90	89	1		
Hotel Washington.....	78	82		4	
Transportation.....	216	185	31		
Total, supply department.....	3,066	2,895	191	20	171
Accounting department					
Health department.....	5	5			
Executive department.....	850	770	80		
Total (3 departments).....	360	361		1	
Panama Railroad:					
General manager.....	73	63	10		
Transportation.....	236	263		27	
Receiving and forwarding agency.....	707	668	39		
Total, Panama Railroad.....	1,016	994	49	27	22
Grand total.....	9,575	9,086	683	194	489

Increases were shown in 8 of the 21 units of the organization, as reported above, and decreases in 12. The increase of 9 men in the electrical division was due to the need of another gang for outside work. Increase of 97 in the dredging division was due to increased general activities of that division. The mechanical division increase of 38 was due to the application of the 40-hour week law. Increased building activities and change to 40-hour week caused increase in gold force and consequent increase of 16 in silver personnel. The transportation division of the Panama Railroad shows an increase of 27 men which is due to temporary fluctuations of activities on the dates shown.

No difficulty was experienced in maintaining the force; on the contrary, unemployment and the pressure for work presented one of the problems of the year and occasioned efforts to afford employment through grading and road-building jobs which employed a maximum of labor.

WAGE ADJUSTMENTS

GOLD EMPLOYEES

The Panama Canal Act provides that salaries or compensation fixed thereunder by the President, or by his authority, "shall in no instance exceed by more than 25 percent the salary or compensation paid for the same or similar services to persons employed by the Government in continental United States." Concurrently with this limitation it has been the policy to pay generally to United States citizens employed on the gold roll the full 25 percent above pay for similar work in the United States, within the limitations of appropriations and subject to the preservation of coordination within the organization.

In conformity with the provisions of the Economy Acts of June 30, 1932, and March 3, 1933, and the policy of the President since the Economy Act of March 20, 1933, went into effect, the wage and salary schedules for gold employees in effect on June 30, 1932, remained unchanged throughout the year except for the establishment of a few rates not provided in the schedule then in effect. Percentage deductions from pay were made as required by the Economy Acts and as subsequently authorized by Executive orders of the President.

The wage board, consisting of the assistant engineer of maintenance and a representative selected by the organizations of employees and approved by the Governor, held two meetings during the year in connection with the rate of pay for the chauffeur of the president of the Panama Railroad, and rates of pay for officers on the crane boat *Atlas*.

The salary board, composed of the heads of the nine major departments and divisions of the Panama Canal and Panama Railroad, held no meetings during the year.

The complaints board, for the purpose of investigating and reporting on complaints of employees about working conditions and administrative actions, etc., referred to it by the Governor, held one meeting during the year, one case having been referred to it.

The provisions of the Independent Offices Appropriation Act of March 28, 1934, establishing a 40-hour week were complied with by establishing hours of work for those affected which would result in 40 hours of work per week and adjusting rates of pay where necessary so that earnings remained the same as when previously working 48-hour weeks.

SILVER EMPLOYEES

As in the case of rates of pay of gold employees, the compensation of alien employees on the silver roll remained practically unchanged throughout the year. The silver wage board held no meetings during the year.

The average rates paid to alien employees as of October 1, 1933, when the annual general survey was made, as compared with preceding years, were as follows:

	Average rates			Average rates	
	Monthly employees (per month)	Hourly employees (per hour)		Monthly employees (per month)	Hourly employees (per hour)
Nov. 1, 1923-----	\$55.27	.2312	Oct. 1, 1929-----	55.37	\$0.2450
Nov. 1, 1924-----	54.74	.2323	Oct. 1, 1930-----	57.09	.2560
Nov. 1, 1925-----	55.28	.2385	Oct. 1, 1931-----	57.46	.2460
Nov. 1, 1926-----	55.40	.2395	Oct. 1, 1932-----	54.34	.2400
Oct. 1, 1927-----	54.88	.2411	Oct. 1, 1933-----	56.95	.2510
Oct. 1, 1928-----	56.44	.2496			

¹ Prior to the 15 percent Economy Act deduction.

The average rate per month, ignoring the Economy Act deduction of 15 percent, and combining the monthly rates with the hourly on the basis of 208 hours per month was \$54.77 for 9,552 positions, as compared with a similar figure of \$52.41 for 9,594 positions the preceding year; an increase of \$2.36 per month. Reducing the \$54.77 per month by 15 percent, or \$8.22, results in \$46.55 per month which is \$5.86 less than the average shown for October 1932. As with the gold employees this 15 percent reduction was reduced to 10 percent, effective February 1, 1934.

The average rates of pay shown above were ascertained by making periodically a compilation and classification covering the rates of pay of all alien employees in the service. The figures shown above do not represent average earnings but the average rates of pay at which these employees are carried on our time rolls. Average yearly earnings will fall somewhat below the annual equivalents of the average monthly and hourly rates shown above. The reason is that these employees do not receive any leave of absence with pay, excepting sick leave, and, consequently, any absences from duty, not covered by a physician's certificate, are without pay.

Under Executive orders the maximum rate of compensation authorized for alien employees is \$80 per month, or 40 cents per hour, with the exception that authority has been granted to exceed these maximum rates in the cases of not more than 112 alien employees of the Panama Canal and Panama Railroad Co. The basic hourly rate of compensation for common labor has remained at 20 cents an hour since 1922, with subsequent provisos that 21 or 22 cents may be used as the entrance rate. These rates, however, are subject to the provisions of the Economy Act of March 1933.

Wages of alien employees of the Panama Canal and the Panama Railroad Co. bear no definite relation to wages of corresponding classes of employees in the United States. During the construction of the Canal, rates of pay equal to or slightly in excess of rates

prevailing for tropical labor throughout the Caribbean area were established for these employees. Surveys of the wages prevailing for tropical labor throughout the British West Indies and the countries of Central America, as well as selling prices of certain selected staple commodities, are made from time to time to secure a basis of comparison with the pay and costs in the Canal service.

As a further aid in maintaining an equitable scale of rates of pay and maintaining the standard of living of these employees, a weighted price index, reflecting price changes in the commissaries on more than 100 staple items in common use among these workers, has been carried forward for a number of years. With 100 adopted as an index figure reflecting commissary prices in 1914, the index rose to a peak of 168.98 in 1921, but since declined gradually until the 1934 index figure showed an increase in the cost of living over 1914 of 5.18 percent. Upon the recommendation of the silver wage board it was decided to establish a new index, based upon 1932 prices, and to correlate the wage scale to the more recent costs with consideration of revision in the expenses of employees on account of changes in conditions since the years of Canal construction, and compilation of data to determine this index was begun but is still in the process of revision.

SUPERANNUATED ALIEN EMPLOYEES

Alien employees of the Panama Railroad Co. who are no longer able to perform useful service in any capacity are retired from the rolls and given either a lump-sum payment, with repatriation, or a small annuity. Since June 1, 1928, 19 such employees have been given lump-sum payments ranging from \$25 to \$500 and 191 employees were granted pensions ranging from \$7 to \$25 per month. Since 1928, 34 pensioners have died and 2 disappeared, leaving 155 pensioners at the end of the fiscal year. The average payment was \$12 per month. The following table shows the number of those retired, the number of those granted monthly and lump-sum payments, and the number still receiving monthly payments at the end of the year:

Fiscal year	Lump-sum payments	Monthly payments	Total employees retired	Died in year indicated							Still living out of year's superannuates
				1928	1929	1930	1931	1932	1933	1934	
1928			1								1
1929											
1930	7	26	33			2	5	1		6	12
1931	2	13	15			3	2				8
1932	2	24	26			2	1			2	19
1933	3	67	70					1		6	60
1934	5	60	65							5	55
Total	19	191	210		2	8	5	2	19		155

The foregoing applies only to superannuated alien employees of the Panama Railroad Co. No provision exists for the payment of pensions to superannuated alien employees of the Panama Canal. However, a repatriation fund was made available this year to assist these employees to return to their former homes.

As an aid in meeting this problem, domiciliary care for superannuated alien employees has been provided in connection with the insane asylum at Corozal, but few of the employees are willing to stay there, and in any event the facilities available do not allow taking care of any considerable number of employees, some of whom have one or more dependents. Moreover, the per capita cost of institutional care thus furnished exceeds the amount it would cost to provide a small pension and permit the employee to live his normal life among people of his own race.

The remedy for this situation lies in appropriations by Congress. The form of legislation desired, and further explanation of the need of it, and of the cost, are presented below under "Administrative problems."

PUBLIC AMUSEMENTS AND RECREATION

Operation of the Canal clubhouses, with their related activities of playgrounds, kindergartens, athletic fields, swimming pools, etc., continued as in past years, but with a reduction in the amount appropriated by Congress and with a greater proportion of the expense borne by the receipts from charges for admission and services. As private industry is not permitted within the Canal Zone, the supplying and supervision of recreational facilities for the Canal employees and their families is a function of the Canal organization.

The clubhouses operated in the year were as follows: Gold clubhouses at Ancon, Balboa, Pedro Miguel, Madden Dam, Gatun, and Cristobal, with a boathouse near the quarantine station and a bathhouse and refreshment stand at Farfan Beach, and with playgrounds at Ancon, Balboa, Pedro Miguel, Gatun, and New Cristobal; clubhouses for the silver employees were operated at La Boca, Red Tank, Paraiso, Madden Dam, and Cristobal, and a clubroom at Gamboa, with playgrounds at La Boca, Red Tank, Paraiso, Gatun, Camp Bierd, and Mount Hope. All clubhouses are open daily from 16 to 18 hours, including Sundays and holidays. The facilities at the bathhouse for gold employees at Farfan Beach have been augmented during the past year. This beach has been quite freely patronized by gold employees and their families for swimming and picnics and is partially supplying a great need for this class of recreation.

During May of this year the contracts covering the operation of the Canal Zone restaurants were terminated, and this activity was

taken over by the bureau of clubs and playgrounds, and restaurant operations are being carried on at the clubhouses. This has necessitated a considerable extension to the Balboa clubhouse structure to accommodate the restaurant patrons, and at Ancon arrangements are being made to reconstruct the former restaurant building and to remove the clubhouse and restaurant activities to that building. At other points in the Canal Zone the restaurant business has been incorporated in the present clubhouses or is being tentatively continued in the structures formerly used by the restaurant contractors, pending completion of plans for permanent location. The transfer of the restaurant operations to the bureau of clubs and playgrounds has resulted in more satisfactory service to the employees and has slightly increased the other activities of the clubhouses by reason of their increased patronage.

New clubhouse buildings are needed at Balboa, La Boca, and New Cristobal, as well as considerable extensions to the restaurant buildings at Ancon and Cristobal. There is also urgent need for the construction of an annex to the play shed at Balboa to provide accommodations for the physical activities of the pupils of the Junior College and of the other educational institutions in this area.

ADMINISTRATIVE PROBLEMS

One of the major duties of the Governor and his assistants is planning improvements, both in present administration and facilities and in provision for future needs. Brief discussion on some of the more important matters affecting operations are presented herewith.

LEGISLATIVE RECOMMENDATIONS

In addition to appropriations for developments and replacements, the need of which is explained on the following pages, it is desirable to have specific legislation providing in substance as follows:

Pensioning alien employees.—That the Governor of the Panama Canal, under such regulations as may be prescribed by the President of the United States, may pay cash relief to such alien employees of the Panama Canal as may become unfit for further useful service by reason of mental or physical disability resulting from age or disease not the result of vicious habits: *Provided*, That such cash relief shall not exceed \$1 per month for each year of service of the employee so furnished relief, with a maximum of \$25 per month, nor be granted to any employee having less than 10 years' service with the Panama Canal, including any service with the Panama Railroad Co. on the Isthmus of Panama.

That there be appropriated annually such sums as may be necessary to carry out the provisions of this act.

Tolls.—That the first five sentences of the third paragraph of section 5 of the act of August 24, 1912 (37 Stat. 560, 569), as amended by the act of June 15, 1914 (38 Stat. 385), are hereby amended so as to read as follows: "Tolls on

merchant vessels, Army and Navy transports, colliers, hospital ships, supply ships, and yachts shall be based on net vessel tons of actual earning capacity, determined in accordance with the 'Rules for the Measurement of Vessels for the Panama Canal' prescribed by proclamation of the President, November 21, 1913, as hereafter amended from time to time by order of the President, and shall not exceed \$1 per net vessel-ton so determined, nor be less than 60 cents per net vessel-ton so determined, on laden vessels, and on vessels in ballast without passengers or cargo shall be less than the rate of tolls for vessels with passengers or cargo: *Provided*, That no charge shall be made for deck load, which is defined, for the purposes of this act, as cargo situated in a space which is at all times exposed to the weather and the sea and which space is not included in the net tonnage determined under the said 'Rules for the Measurement of Vessels for the Panama Canal.' Tolls on other floating craft shall be levied on displacement tonnage at rates to be prescribed by the President. In addition to the tolls based on measurement or displacement tonnage, tolls may be levied on passengers at rates prescribed by the President but not to exceed \$1.50 for each passenger. The levy of tolls is subject to the provisions of article XIX of the convention between the United States and the Republic of Panama, entered into November 18, 1903, and of article I of the treaty between the United States of America and the Republic of Colombia, proclaimed March 30, 1922."

DISCUSSION OF PROPOSED LEGISLATION

PENSIONS FOR ALIEN EMPLOYEES

American citizens employed by the Panama Canal or Panama Railroad Co. are subject to retirement under the Panama Canal retirement law, but this provision applies only to American citizens. A very large number of the Canal and Railroad force are aliens and they are without benefit of legal provision for retirement when, through superannuation or other physical disability, they can no longer perform their work. The Panama Railroad Co. can and does give to such of its alien employees pensions ranging from \$7 to \$25 per month, but there is no authority to do this with employees of the Panama Canal. All that can be done for them is to offer them care at Corozal Hospital, where there are no accommodations for their families, or to carry them on the rolls at reduced pay at rates from \$15 to \$35 per month to perform such work as they can. It would be much better to grant them a small annuity and move them away from the Isthmus.

The cost of caring for these employees, on the basis of an average pension of \$20 per month, has been estimated at about \$12,000 for the first year, with a gradual increase to a maximum of \$121,000 a year for the twentieth year and each year thereafter.

The cost is not high considering the number of employees concerned, and the relief recommended is considered not only humane but a step toward more efficient operation through weeding out those who are no longer capable of service and then requiring of everyone on the active roll the normal daily performance of service.

REPATRIATION OF UNEMPLOYED ALIENS

The growth of the population of West Indian negroes in this vicinity has been in excess of the need of labor, and with the decrease in Canal activities, as well as in business in Panama generally, there has been acute unemployment among both West Indians and natives of Panama. Partial relief is sought through repatriating a number of West Indians and their families, and the Republic of Panama has requested that the United States "proceed with the repatriation of unemployed foreign workers who have collected in the cities of Panama and Colon because of being left without work in the Canal Zone."

As these aliens are resident in territory of Panama, the participation of the United States in the movement would be in paying expenses of repatriation. The presence on the Isthmus of many of the aliens is due to their having come to work on the Canal, and while the United States has brought no contract laborers to the Isthmus since 1913 and has regularly offered repatriation to discharged laborers who came to the Isthmus either under contract or on their own account and has taken the initiative in discouraging further immigration and requesting Panama to restrict it, the fact is recognized that the existing surplus of alien West Indian population in the two terminal cities is detrimental to the interests of Panama and to the relations between that country and the United States, and that it is to the joint interest of the two Governments to apply to the situation such remedies as are advisable and practicable.

A sum of \$150,000 has been provided by an appropriation for the repatriation of unemployed West Indians and their families who have rendered at least 3 years' service with the United States Government or the Panama Railroad Co. In addition, allowances may be granted in meritorious cases of \$25 for single men and \$50 for men with families, who may also be allowed \$10 for each minor child, provided that the total amount allotted to an employee shall not exceed \$100.

It is planned to persuade as many of the unemployed West Indians as the fund will take care of, perhaps 1,000 families, to take advantage of this repatriation and the sum for rehabilitation in their home country. It is hoped that this will relieve somewhat the unemployment situation in the vicinity but the necessity for making some provision for granting annuities to alien Panama Canal employees will still remain and grow more acute as those now in service grow older.

TOLLS—DUAL-MEASUREMENT SYSTEM

The legislation affecting tolls is in the same form as in the bill which was passed by the House of Representatives in the second session of the Seventy-third Congress and substituted in the Senate for the former Senate bill, except that in the draft now proposed the word "hereafter" has been inserted with respect to amendments to the Panama Canal rules of measurement. This is in accordance with the suggestion of a Member of Congress that such insertion would clarify the bill. The bill failed of passage in the Senate. Its basic purpose, as was outlined in the annual report for 1933, is to place the charges directly under the control of the President and within the limitations prescribed by Congress and to simplify the collection of tolls. The present system has the effect of basing the amount of tolls on the measurement of the vessel under the rules for the measurement of "registered tonnage." These rules grant exemptions from charges on spaces which are actually used for the carriage of passengers and cargo. Further, as such rules may be changed from time to time by an official of the United States not connected with the operation of the Canal, and have frequently been so changed, the actual basis of collection of tolls is not controlled by the President or Congress. As a remedy to this situation it is proposed that there be adopted a single basis of measurement of interior earning spaces under the rules of the Panama Canal which have been approved by the President and may be amended by him. Opposition to the passage of the bill has been made by American steamship owners because it is expected to cause an increase in tolls charges on some of their vessels. In view of this opposition, the Secretary of War indicated that he would recommend to the President, after the enactment of the legislation with the proposed maximum rate of \$1 per ton, that he establish a tolls rate on laden vessels of not more than 90 cents. This rate on the 1933 tonnage would have produced approximately the same aggregate total as was collected in 1933 under the existing dual system of measurement. He stated further that he would direct that a study be made of Panama Canal rules for the purpose of changing them so as to secure more equitable treatment for all vessels. In comment, the Secretary of War stated that the passage of the bill is essential to remove the existing inequalities in the treatment of shipping now passing through the Panama Canal and to prevent further reductions in tolls charges by structural changes in vessels that reduce tonnages but have practically no effect on the cargo-carrying capacity of vessels.

The present toll-measurement system is irregular with respect to charges actually collected, is out of line with good administration in allowing charges to be determined by an agency not specifically re-

sponsible for such function, and is inequitable in its application to the ships using the Canal. Under it some ships pay the same amount for transit when heavily laden as when in ballast, with neither passengers nor cargo. On ships of approximately equal earning capacity, as measured by interior spaces which may be devoted to the carrying of cargo and passengers, one may pay tolls which are proportionately 50 percent higher than charges on the other. The charges on vessels in ballast are disproportionately high; they must now pay 72 cents per net ton, Canal measurement, unless such amount would be greater than \$1.25 times the net tonnage as measured under United States rules, and as a class they pay about 83 percent as much as they would for transit fully laden, although the intent of Congress in the original tolls legislation was that vessels in ballast should pay no more than 60 percent of the rate for laden vessels.

The inequity and even the absurdities of the present system have been clearly recognized and generally admitted. The opposition to adoption of the scientific Canal basis rests wholly on the question of increased costs. As stated, the administration is endeavoring to reach an acceptable adjustment in this matter. In the meantime, it is urgently recommended that the remedial legislation be passed so that it will be possible to put into effect an equitable and reliable method of levying tolls. The Panama Canal rules of measurement, having been devised after extensive study to determine the earning capacity precisely and fairly for the various types of ships, provide such a reliable and equitable method, subject to some amendment in line with ship development. These rules are essentially like the Suez Canal rules and their fitness for the purpose for which devised has never been questioned.

Genesis of rules.—The authority for levying tolls is found in the Panama Canal Act of August 24, 1912, as amended. It contains general provisions for the levying of tolls and authorizes the President to establish rules for measurement of vessels and rates of tolls within the limitations set by the act. The act provided that "Tolls may be based upon gross or net registered tonnage, displacement tonnage, or otherwise"; "may be lower upon vessels in ballast than upon vessels carrying passengers or cargo"; "when based upon net registered tonnage for ships of commerce the tolls shall not exceed \$1.25 per net registered ton nor be less than 75 cents per net registered ton"; and "if the tolls shall not be based upon net registered tonnage they shall not exceed the equivalent of \$1.25 per net registered ton as nearly as the same may be determined, nor be less than the equivalent of 75 cents per net registered ton."

Pursuant to the authority vested in him by Congress, the President issued a proclamation under date of November 13, 1912, which established rates on commercial ships as follows:

1. On merchant vessels carrying passengers or cargo, \$1.20 per net vessel-ton—each 100 cubic feet—of actual earning capacity.
2. On vessels in ballast without passengers or cargo 40 percent less than the rate of tolls for vessels with passengers or cargo.

The determination of the "net vessel-ton" or "net tonnage" on which the charges as above were to be levied was established by the Panama Canal rules of measurement, promulgated by a proclamation of the President, dated November 21, 1913, as put into effect immediately upon the opening of the Canal to commercial traffic.

Subsequently, upon a protest of certain shipowners regarding charges on deck cargo, the question of the interpretation of the act of Congress regarding tolls charges was referred to the Attorney General for decision. He decided that the term "net registered tonnage" as used in the act must be interpreted to mean the net tonnage of a vessel as measured under the rules prescribed by the statutes of the United States.

Inasmuch as the act provided that the tolls charges should not exceed \$1.25 per net registered ton nor be less than 75 cents per net registered ton, the President ordered, in view of the decision by the Attorney General, that rules and regulations be issued with respect to the tolls "so that no tolls shall be demanded or collected upon any vessel of commerce which shall aggregate more than \$1.25 upon the net registered tonnage as measured under the statutes of the United States", and so drawn "as to produce a similar result with respect to the minimum that may be charged." It was anticipated by all concerned that the Congress would pass remedial legislation dealing with the subject more completely and satisfactorily, "but", to quote from the letter of the President, "until that course is taken, the way herein suggested seems to me to be the best one to meet the existing situation."

Result of rules.—Net tonnage as measured for national registry is universally lower than the tonnage as measured in units of 100 cubic feet of actual earning capacity (which is the Canal basis), and it is the practice of nations to keep registered tonnage of their ships down so as to reduce the light dues and port charges based on it. This practice is generally recognized and accepted, much like appraising property for taxation at figures lower than the real worth. As the port charges may be a few cents per net ton, in any event a relatively low figure, the figure for number of tons on which they are levied is not of great importance; also, the rate of port charges can be adjusted upward with consideration of the depressed tonnage. But when it comes to a matter of a charge of \$1, more or less, per ton for a service such as transit through a canal which saves the ship thousands of miles, the net tonnage becomes of vital concern.

Since the "United States net" is in nearly all cases considerably lower than the "Panama Canal net" the practical result is that tolls on laden ships are collected on the basis of \$1.25 times the United States equivalent net tonnage. This would not be objectionable if the use of United States net tonnage resulted in equitable charges in proportion to the capacity of the ship. However, they were not devised to determine such capacity and are changed from time to time (usually so as to decrease the net tonnage, by increasing the exemptions from inclusion in net tonnage) and the changes often seem illogical and result in inequities between ships when used for toll charges. It is to be noted that while the purpose of the Canal rules of measurement is to include all space used for earning revenue, except deck space, national registry measurement aims often at excluding such spaces from net tonnage. The one system is directed toward justice, the other frequently toward privilege.

On ships transiting the Canal in ballast, the rate of 72 cents times the Panama Canal net prevails, except that the amount so derived may not exceed \$1.25 times the United States net. Due to these conflicting limitations, many ships with relatively low net tonnage, as measured under United States rules, pay the same amount for transit when laden as when in ballast. Ballast ships as a class pay considerable more than the amount which is "40 percent less" than the charge for like ships when laden.

The heavier charges on ballast ships caused by the existing rules are one element in the interference with levying equitable charges. Assuming that they should not pay over 60 percent of the amount paid when laden, which was accepted as proper when the Canal rules were made, they are now being rather heavily overcharged as compared with laden vessels.

Difficulties and inequities occur also in levying tolls on laden ships under the dual system, due to the uncertainty and variability of the net tonnage as measured under registry rules. Examples are in the rules concerning shelter-deck spaces, passenger cabins, tonnage openings, scuppers, freeing ports, bulkheads, etc., in which some change of ruling in connection with United States measurement may arbitrarily affect the inclusion or exemption of spaces, without relation to the actual value and use of such spaces for carrying cargo. The technical details have been explained in separate reports; the essential point is that the situation results in uncertainty on the part of both the Canal and its users as to the important matter of tolls charges, and such charges are determined to a large extent by the orders and interpretations of an unrelated agency which is concerned with other matters than the justice of Canal tolls.

In individual instances the inequities resulting from application of the United States registry rules may affect a ship or fleet unfairly. Naturally the advantages gained by one group are reflected as disadvantages to their competitors. As applied to traffic as a whole, the factor of the United States rules results in reducing Canal tolls.

Reduction of revenues.—The reduction of revenues from tolls on laden ships occurs because it is possible to reduce the United States registry measurement without reducing correspondingly the earning capacity of the ship; and, as the United States equivalent net tonnage is reduced, the tolls collectible, limited to \$1.25 per net ton, so determined, are reduced correspondingly. In the fiscal year 1917, the first for which record has been kept of the aggregate United States equivalent net tonnage of vessels transiting the Canal, such tonnage for the 1,803 commercial transits totaled 4,702,063 tons. The net tonnage for the same vessels as measured under the Panama Canal rules totaled 5,798,557 tons. The United States equivalent net tonnage was accordingly 81.09 percent of the Panama Canal measurement. In such proposition, if we assume a vessel of 10,000 net tons, Canal measurement, the United States registry net would be 8,109 tons; or, to draw nearer to practical comparisons with average actual ships, a ship of 5,000 net tons, Canal measurement, would be of 4,055 tons as measured under registry rules. On the original Panama Canal basis, tolls for the transit of a 5,000 net ton ship would have been \$1.20 times the net tonnage, or \$6,000. With the limitation that the tolls may not exceed \$1.25 times the registry tonnage as determined under United States rules, the tolls collected would be \$1.25 times 4,055, or \$5,068.75. The tolls were, therefore, reduced by \$931.25 and amounted to slightly over \$1 per Canal net ton.

In the course of the effort to have the Panama Canal rules adopted as the sole basis of measurement, the Canal administration has proposed that a maximum rate of \$1 per Canal net ton be established for laden ships. On such basis the laden ship of 5,000 net tons would pay \$5,000. In the ratio of Canal net to registry net in 1917 this would have been slightly less than the equivalent of \$1.25 times the United States registry net measurement.

Through the years since 1917 the net tonnage, as measured under United States registry rules has been reduced by virtue of various rulings of the Commissioner of Navigation, and by changes in ships' structures to take advantage of the rulings, but the Panama Canal net measurement, which determines interior carrying capacity, has not decreased. The percentage which the aggregate United States registry measurement net tonnage has formed of the Panama Canal

net tonnage of transiting vessels in the fiscal years from 1917 to 1934, inclusive, is as follows:

Fiscal year	Percentage	Fiscal year	Percentage
1917.....	81.09	1926.....	78.52
1918.....	80.55	1927.....	78.41
1919.....	84.80	1928.....	77.61
1920.....	82.95	1929.....	76.39
1921.....	81.85	1930.....	75.66
1922.....	80.59	1931.....	74.10
1923.....	80.44	1932.....	72.84
1924.....	80.15	1933.....	71.72
1925.....	79.33	1934.....	71.21

Reverting to the 5,000-ton ship, measured under the Panama Canal rules, which are constant, in 1934 its net tonnage as measured under the United States registry rules would be only 3,561 tons, or 71.21 percent as great as its Canal net. Tolls, instead of being \$6,000, as originally intended, or \$5,000 on the proposed maximum basis of \$1 per Canal net ton, or \$5,068.75 on the basis of the United States registry measurements as in 1917, would be \$1.25 times 3,561, or \$4,451.25. In other words, on this hypothetical representative ship the actual tolls charges under the dual system decreased by \$617.50 between 1917 and 1934, or 12.18 percent, due simply to changes and adjustments under the registry rules and not to any change in rates or in the earning capacity of the ship.

The above table of percentages indicates a continued downward trend. There is no definite limit to the decline under present law. The revenues of the Canal are at the mercy of the officials who establish and interpret the rules for measurement for registry in the United States.

The peculiar effects of the United States registry rules of measurement on the net tonnage of vessels, hence on Panama Canal tolls, are illustrated by the case of the passenger liner *Empress of Britain*, a large steamer which has made several cruises around the world, passing through the Suez and Panama Canals. Her net tonnage as measured under the Suez rules is 26,531 tons and for transit through the Suez Canal at present rates she would pay \$29,443, plus any charge for individual passengers. (Suez tolls are paid in gold and the figure is for normal exchange; with depreciated currency to buy gold francs the amount is higher.) The net tonnage of this vessel under Panama Canal rules is 27,503 tons. Her net tonnage under British registry rules is 22,545 tons. Under United States registry rules in effect at the time of the latest transit of the *Empress of Britain* through the Panama Canal her net tonnage measured 15,153 tons, and tolls paid, at \$1.25 per ton, were \$18,941.25. The United States registry rules set the net tonnage at more than 7,000 tons

less than the British registry measurement, and the tolls paid for passage through the Panama Canal are approximately \$10,500 less than the amount paid at Suez.

The main reason for the difference between British and United States registry measurements (22,545 and 15,153 tons, respectively) was the exemption of certain so-called "cabin spaces" under the United States rules. One entire upper deck of the vessel is devoted to lounges, libraries, social halls, smoking rooms, etc., which under the British rules (and the Suez and Panama Canal rules) are subject to measurement and inclusion in the net tonnage. There was no stateroom on the deck. Taking advantage of an American ruling relative to such spaces in relation to staterooms, the owners removed from a small cloak and check room the original equipment and installed a bed, chiffonier, and portable washstand, and called it "Apartment A." This secured the exemption of space amounting to 3,319 tons from inclusion in the net tonnage as determined under United States registry rules, in addition to 4,181 tons exempted in other passenger spaces under United States rules but not under British or Canal rules. The result is in effect a gift to the steamship company from the United States Government of approximately \$9,000 through this one feature alone; as stated, the Panama Canal tolls were less than those at Suez by about \$10,500.

The case of the *Empress of Britain* is notable because of the size of the vessel and the amounts concerned but is fairly representative of the principles involved.

Remedy.—Insofar as the necessity of measuring vessels under two kinds of rules is concerned, this could be determined by action of the President, who might order that the tolls be levied on the basis of net tonnage as determined under the rules of measurement for registry in the United States. This, however, would make things worse by subjecting the Canal tolls collection completely to the vagaries of the registry measurements. It would abandon entirely the scientific, equitable, and stable Canal measurement and substitute a system not designed as a basis of levying tolls for cargo-carrying capacity, variable according to minor conditions not affecting capacity, and subject to changes in accordance with rulings of the Commissioner of Navigation.

The remedy needed is to get back to the Panama Canal rules of measurement as a basis and to use them uniformly, applying such rates as may be prescribed by Congress and the President.

Rates proposed.—As stated, the Canal administration has proposed the adoption of rates of \$1 per net ton for laden ships and 60 cents per net ton for ships in ballast, on the basis of Canal measurement. When the suggestion was originally made the proposed

basis would have caused the collection of tolls approximately equal to those then being collected under the dual system. However, with the continuous decline in registry net tonnage as measured under the changing United States rules, the proposed figures would now occasion a moderate increase on laden vessels generally, with a decrease in charges on ballast ships; and the tendency to an increase as the result of applying the Canal rules will grow as the amounts collected under the present basis continue to decrease. Opposition to remedial legislation has grown stronger as certain shipping companies have benefited more and more by the workings of the present system.

Equity of proposed tolls.—The maximum tolls on the basis proposed by the Panama Canal, of \$1 per Canal net ton for laden vessels, would be about 14 percent lower than Suez charges for laden ships. However, the law now proposed would allow the President discretion to adjust the rates between \$1 and \$0.60 per net ton, Panama Canal measurement, for laden vessels, the ballast rate to be less than the laden rate. It would extend to him the same discretion intended by the Panama Canal Act but would keep the tolls on the definite and equitable basis of the Canal rules of measurement, accurately and fairly related to earning capacity. The President might set the rate below \$1 per ton, as is justified in his judgment. The main point would be that an equitable and uniform basis would be in effect and the charges for transit through the Canal would be fairly related to the earning capacity of the ship, and the revenues of the Government from its service to shipping would be what the Government intends them to be.

Confronted with the adoption of the Canal basis only for tolls collection, some American steamship owners have proposed that the rate of 80 cents per Canal net ton be adopted for laden ships and have also proposed as a general basis that no rate should be adopted which would increase the charges on any American ship. The first proposal would set a rate too low, as judged by the service rendered to the ships, the cost of building and operating the Canal, and comparison with other canal rates and rates for land transportation. The second proposal seems completely unreasonable, not only because of the elements cited with respect to the first proposal but because it would demoralize tolls and revenues in order not to deprive a few ships of special benefits to which they are not in equity entitled. It would be a case of making great sacrifices to protect the beneficiaries of an abuse.

The justice of charging tolls at essentially the level of \$1, or 90 cents per ton for laden ships, is well established and is not opposed

except by individuals or organizations which desire individually to benefit through reduction of charges. In this connection it is sometimes claimed that a reduction in tolls rates would be an aid to American shipping. That this is a dangerous conclusion to jump at appears from the following brief facts. In the fiscal year 1934, tolls paid by foreign ships were 54 percent of the total tolls, those by United States ships in the intercoastal trade 36 percent, and those by United States ships in foreign trade 10 percent. A lowering of Canal tolls below the value of the service rendered should be considered in the nature of a subsidy to shipping. On the basis of the traffic of the past year, each million dollars of tolls reduction would represent a subsidy of \$540,000 to foreign shipping, of \$100,000 to those ships of the United States which are in competition with foreign flags, and of \$360,000 to United States shipping not in competition with foreign shipping. It is thus seen that, as far as United States shipping is concerned, the greatest reduction would be to vessels engaged in the intercoastal trade of the United States. These vessels are protected against the competition of foreign lines and their competition is with the land transportation systems in the United States. Expenses of operation and maintenance of the Canal will increase on account of the necessity of replacements and betterments. It appears in line with sound business practice not to lower the rates of tolls below the present levels, or approximately the proposed rates on the Canal measurement basis. On the contrary, it is essential to establish the levy of tolls on an equitable basis and to put an end to the situation by which the Government is being deprived of legitimate revenue at an ever-increasing rate through the workings of the dual measurement system.

GENERAL PROGRAM

The Canal administration prepared in 1931 a program of work to be carried on through a 10- to 15-year period in making various betterments, enlargements, and replacements. For the more pressing needs a 5-year program was developed, requiring a total expenditure of approximately \$15,000,000. This was exclusive of the Madden Dam construction. Decreased national revenues led to some deviation from the original plans. Estimates for the fiscal year 1934 under this plan called for an appropriation of \$2,466,000 for betterments, and \$1,278,853 was actually appropriated by Congress, but due to the definite limitation of withdrawals it was not possible to proceed with the construction as contemplated.

WORK IN FISCAL YEAR 1934

In lieu of the \$1,278,853 appropriated by Congress, as shown in the preceding paragraph, there was allotted to the Panama Canal for expenditure the sum of \$1,000,000, which was apportioned as follows:

Dredging division station at Gamboa-----	\$50,000
Dredging division steel barge-----	100,000
New quarters for gold employees-----	175,000
High school and junior college building, Balboa-----	300,000
Docks 14 and 15, Cristobal-----	375,000

All but \$150,000 of this special National Industrial Recovery Act allotment had been expended by the end of the fiscal year.

WORK IN FISCAL YEAR 1935

The \$150,000 balance from National Industrial Recovery Act funds remaining from the fiscal year 1934 has been apportioned for the fiscal year 1935 as follows:

Dock 15, Cristobal-----	\$45,000
Quarters for gold employees-----	13,000
High school and junior college, Balboa-----	92,000

For the fiscal year 1935 the Budget Bureau has placed a limitation of withdrawals from the Treasury at \$10,884,908. The savings from the \$10,600,000 limitation placed on the Panama Canal by the Budget Bureau in 1934 amounted to \$781,700, and from the \$1,110,000 reserved for impoundments in 1934 there was an additional saving of \$415,582, making a total saving of \$1,197,282 available for allotment in 1935. Of this amount \$171,499 was carried forward to reduce the amount required for 1936, and the balance of \$1,025,783 was allotted in 1935 to take care of the extra cost of the 40-hour week and the 5-percent pay restoration. It, therefore, was not necessary for the Panama Canal to request additional funds for these two items.

The amounts allotted for capital items for the year 1935 are as follows:

Grading for building sites—Gatun-----	\$110,000
Storehouse and roads, Cristobal shops area-----	70,000
Quarters for American employees-----	300,000
Dock 14, Cristobal (to complete)-----	13,777
Drydock crane (to complete)-----	42,626
Conversion of Pedro Miguel restaurant to district quartermaster's office and post office-----	11,570
Conversion of Balboa restaurant to police station and magistrate's court-----	80,000
Towing locomotive-----	45,000
Rebuilding Fort Randolph Road (beginning)-----	71,500
Madden Dam-----	1,386,602

EXPLANATION OF FOREGOING ITEMS

Grading for building sites, Gatun.—In connection with the replacement of gold quarters, a large amount of municipal work is required

in the grading and preparation of building sites, the installation of water and sewerage lines, and the paving of streets, due to the fact that the layout of the present town, which was built as a construction camp, is not suited to development into a permanent town, and hence some changes in plan are proposed. The grading which should be completed during 1935 will give time for the settlement of fills so that necessary building construction can continue during subsequent years.

Storehouse and roads, Cristobal shop area.—This amount is required for the removal and replacement of storehouses and reconstructing roads in this shop area made necessary by the other improvements now being completed. Effective use of this area depends on this additional work.

Quarters for American employees.—The appropriation requested for 1935 and the amounts that will be requested in the following years are urgently needed to continue the replacement of those very old and dilapidated frame buildings which were constructed either by the French Canal Co. or during the earliest days of American occupation of the Canal Zone. The program outlined by the Canal administration calls for \$500,000 for replacement of old quarters each year, although \$600,000 or \$700,000 annually would produce greater economy in the end. At \$500,000 per year it will take about 24 years to replace the present old quarters. A portion of the unexpended N. I. R. A. funds (\$13,000) has been allotted for this work.

Dock 14, Cristobal.—The 400-foot extension on this dock will be completed this fiscal year and the construction of the extension is of timber, conforming to the original 290-foot dock. This dock is part of the Cristobal plant of the mechanical division.

Drydock crane.—This is to be used in Cristobal in connection with the work of the recently reconstructed and enlarged drydock. The increased capacity of the drydock makes this crane necessary.

Conversion of Pedro Miguel restaurant to district quartermaster's office and post office.—The bureau of clubs and playgrounds has taken over the restaurant business from private contractors, leaving the Canal with a concrete building which can conveniently be remodeled to provide accommodations for the above offices which are now quartered in old buildings, the upkeep of which is excessive.

Conversion of Balboa restaurant to police station and magistrate's court.—Conversion is necessary for the reasons stated above in connection with the Pedro Miguel restaurant.

Towing locomotive.—The relocation on lock walls of the present towing locomotive, plus the addition of this one, will result in speeding transits of vessels through the Canal and will especially aid the rapid transit of the fleet in emergencies, as has been proven by

the experience gained when the fleet was put through in rapid order during April of this year.

Rebuilding Fort Randolph Road.—This road is the only highway connecting Fort Randolph, Coco Solo Fleet Air Base and Submarine Base, and France Field with Colon. It is rapidly going to pieces under the heavy rains and traffic. It is now being maintained by expensive and short-lived patch-work repairs. The total cost of rebuilding the road will be \$171,500. This item will permit about half of the required work to be done in 1935. One hundred thousand dollars is being requested in 1936 to complete this work.

ADDITIONAL NEEDS

As stated above, lists have been prepared of needed additions and replacements over a period of years and approximate estimates have been made out of the costs. Obtaining funds for this work is one of the most important problems of the Panama Canal. For the construction of the Canal and its many auxiliaries, temporary, inexpensive, wooden structures were built to house the shops and other parts of the construction plant, the employees and many of the public-utility and governmental functions, and many of these continued to be used in the interest of economy for housing the operating plant and personnel after construction was completed. Because of the destructive effects of the elements and of the insects in this locality, the economical life of such structures is relatively short. The plan is to replace these with structures of longer life, and at the same time increase their capacity where justified, as funds are obtained. The undertaking is so extensive that many of these old structures are being maintained at excessive cost, and this uneconomical procedure will continue and become worse at an increased rate unless funds for the purpose can be made available at an increased rate for the next 5 or 10 years.

In this construction work the labor problems are greatly simplified if the funds can be obtained with such regularity as to create a fairly uniform demand for labor.

UNEMPLOYMENT

The allotment of \$1,000,000 from N. I. R. A. funds was of considerable advantage in making work available for the unemployed. There is available now an appropriation of \$150,000 to cover the expenses of repatriation and rehabilitation of former alien employees and their families, but this amount was received too late in 1934 to be made available for expenditure in that year. It will be available in the fiscal year 1935. The Canal Zone and the terminal cities of

Panama and Colon are faced by a condition of permanent unemployment for both Americans and aliens because the natural increase in population is in excess of labor requirements. The Canal administration is endeavoring to so plan its work as to give continuous employment and thus avoid the disadvantages which are inherent in intermittent demand for labor.

CAPACITY OF THE CANAL

A study of the capacity of the Panama Canal for passing ships between the oceans was summarized in the annual report for 1931. Observations of water supply and lockage capacity were continued during the past year and the essential conclusions remain unchanged; i. e., that an average of 26 commercial lockages represents capacity during locks' overhaul, and when this average is reached the third flight of locks should be available for use; and that at a possible average of 7,500 net tons per lockage, the capacity of the Canal as at present is about 70,000,000 or 75,000,000 Panama Canal net tons per year. This is approximately three times the tonnage which passed through the Canal during the fiscal year 1934. With a third flight of locks the Panama Canal could handle about five times the present traffic. The capacity of the Canal is ample for any traffic likely to develop in many years to come. At present our problem is insufficiency of traffic rather than any probability of insufficiency of capacity, and space need not be devoted now to any more detailed comment on capacity, hours of operation, third set of locks, or other means of increasing the capacity.

STUDY OF PANAMA RAILROAD CO. AND PANAMA CANAL

Prof. Marshall E. Dimock, of the University of Chicago, at the instance of the Secretary of War, undertook a study of the Panama Railroad Co. and the Panama Canal, their relations to each other, their structures, activities, practicability as Government-owned corporations, etc. Professor Dimock made this survey on behalf of the University of Chicago at no expense to the Government, and was given every facility by the Secretary of War, the New York office of the Panama Railroad, and the Canal administration. The conclusions resulting from this study will be for legislative and administrative consideration in dealing with other or prospective Government-owned corporations and a report will be rendered the Secretary of War by the university. Professor Dimock visited the Washington and New York offices, arrived on the Isthmus on January 11, 1934, and remained until March 6, 1934.

SECTION IV

GOVERNMENT

The civil government of the Canal Zone is conducted as prescribed in the Panama Canal Act of August 24, 1912, and other acts and Executive orders made applicable to the Canal Zone. Whenever it has been practicable to assign governmental functions to departments in the organization established for the operation and maintenance of the Canal, this has been done. Complete cooperation and greater economy and efficiency are derived from such coordination of functions.

Data on the expenses and revenues of various features of the Canal operation and government are shown in the financial and statistical statements in section V.

AREA OF THE CANAL ZONE

The total area of the Canal Zone and the areas segregated for various purposes, as of July 1, 1934, are shown herewith:

	Square Miles
Total area of the Canal-----	552.8
Land area of Canal Zone-----	361.7
Water area of Canal Zone (inclusive of Madden Lake to +260-foot contour)-----	191.1
	<hr/>
Land areas, military and naval reservations (inclusive of revocable license areas) :	
Military reservations-----	46.84
Naval reservations-----	5.85
	<hr/>
Land areas, Canal Zone town sites (exclusive of Army and Navy posts)-----	52.69
Barro Colorado Island-----	12.06
Forest reserve-----	5.71
Farms, cattle pastures-----	5.47
Target ranges: Revocable license to U. S. Army, west side of Canal; does not include ranges in military reservation-----	77.70
Land areas, not used for any purpose-----	5.60
	<hr/>
	202.47

POPULATION

A house-to-house canvass of the civil population of the Canal Zone, including employees of the Army and members of families of

Army and Navy personnel, but omitting commissioned, warrant, and enlisted personnel, was made by the police force during the month of June 1934. A summary is presented below:

District	Americans			All others			Total
	Men	Women	Children	Men	Women	Children	
Balboa.....	2,203	2,311	2,114	3,680	2,450	5,208	17,966
Cristobal.....	558	682	755	3,443	2,007	4,449	11,894
Prisoners.....	10			92	2		104
Total.....	2,771	2,993	2,869	7,215	4,459	9,657	29,964

The foregoing total indicates a decrease of 1,875 under the 31,839 reported in June 1933.

In addition to the civilian population listed, the military and naval forces of the Canal Zone in June 1934 numbered 9,859 (Army, 8,729; Navy, 1,130), making a total population of 39,823. The corresponding figure as of June 30, 1933, was 42,851, of whom 11,012 were in the Army and Navy. For the 5 years preceding 1933 the totals were: 1928, 37,512; 1929, 39,137; 1930 (national census), 39,467; 1931, 40,565; and 1932, 42,070.

Of the 29,964 civil population in June 1934, a total of 7,218 was employed by the Panama Canal and Panama Railroad Co.; of these 2,419 were Americans, and 4,799 were aliens. Approximately 500 Americans and 4,300 alien employees were living outside of the Canal Zone.

PUBLIC HEALTH

The general health conditions of the populations of the Canal Zone and the two terminal cities of Panama and Colon for the past year have been good, although malaria prevailed to a somewhat greater extent than is usual. No epidemics of diseases have occurred. Public health is discussed in greater detail in the annual reports of the health department for calendar years, which are issued as separate publications, and most of the tables presented in the following paragraphs refer to calendar years.

VITAL STATISTICS

The morbidity and mortality rates from diseases and injuries and other vital statistics covering the populations of the Canal Zone and the cities of Panama and Colon, are set forth in detail in the calendar year annual report of the health department, which is published yearly in pamphlet form. For this reason some of the tables are omitted from this report and the discussion of vital statistics is lim-

ited to a brief résumé of the general death rate, death rates from disease alone, birth rates, and infant-mortality rates.

General death rate.—The death rate from all causes in 1933 for the population residing in the Canal Zone was 7.12 per 1,000 of population (deaths, 305; population, 42,851), being the lowest of record. The comparable death rate in Panama City was 14.96 per 1,000 of population (deaths, 1,182; population, 79,000), being also the lowest of record. The comparable death rate in Colon was 16.27 per 1,000 of population (deaths, 488; population, 30,000).

The general trend in death rates for the population of the Canal Zone and for the terminal cities of Panama and Colon has been downward, as evidenced by the following tabulation:

	Death rates per 1,000 of population, all causes			
	1914-18	1919-23	1924-28	1929-33
Canal Zone.....	11.79	8.00	8.38	7.35
Panama City.....	28.45	20.20	18.12	17.04
Colon.....	24.92	16.42	14.48	16.13

Birth rates, including stillborn.—The birth rate for the population residing in the Canal Zone during 1933 was 11.18 per 1,000 of population, the lowest of record. The birth rate in the Canal Zone has been declining continuously since 1924, at which time it was 21.65 per 1,000 of population. The persistent reduction in birth has affected both the white American and the colored alien population of the Canal Zone, as indicated by the following tabulation covering 5-year periods, segregated by color:

	1919-23		1924-28		1929-33	
	White	Colored	White	Colored	White	Colored
Total birth rate per 1,000 population.....	16.80	28.95	12.75	22.05	9.36	15.03
Live birth rate per 1,000 population.....	16.31	27.30	12.26	20.66	9.13	14.09
Stillbirth rate per 1,000 population.....	.49	1.64	.41	1.39	.23	.94

The birth rate for Panama City was 33 per 1,000 population, indicating a further progressive decrease from previous years, although slightly higher than for the preceding year. The birth rate for Colon was 28.37 per 1,000 population, being slightly less than for the 4 previous years.

Death rates among children under 1 year of age.—One criterion for measurement of the progress being made in public health procedure is the comparison from year to year of infant mortality rates. For 1933, in the Canal Zone, the infant mortality rate per thousand births

for white Americans was 34, and for colored 101, making a combined rate of 76, as compared with a combined rate of 71 for 1932. Great success has been attained in reducing these rates in Panama City and Colon, as is evidenced by the fact that in 1917 infant mortality rates in Panama City were 259 and in Colon 249, whereas in 1933 they were 118 and 115, respectively.

The following table shows infant mortality rates, by 5-year periods, from 1919 to 1933, inclusive:

	Deaths of infants under 1 year, per 1,000 births		
	1919-23	1924-28	1929-33
Canal Zone.....	94.86	96.51	78.89
Panama City.....	154.82	133.40	130.18
Colon.....	139.53	114.50	103.10

Principal causes of death.—Tuberculosis and the pneumonias continue to be the leading causes of death in all three groups of the population, maintaining first and second places in the populations of Panama City and Colon and first and third places in the Canal Zone population. The death rate from tuberculosis in the Canal Zone population is less than one-fifth of comparable rates in Panama City and Colon; tuberculosis affects the colored alien population of the Canal Zone to a far greater extent than the white American population. Deaths from degenerative conditions of the arteries (arteriosclerosis and apoplexy) are continuing to occur with greater frequency.

MALARIA

The malaria rates per 1,000 employees during the past 10 calendar years have been as follows:

1924.....	16	1929.....	21
1925.....	27	1930.....	26
1926.....	14	1931.....	19
1927.....	11	1932.....	14
1928.....	14	1933.....	27

From the foregoing it will be noted that the situation in 1933 with respect to malaria was less favorable than for any year since 1925, during which year the malaria rate per 1,000 employees was the same as for 1933.

The causes of the fluctuations in malaria rates have been discussed in the Health Department annual report for the calendar year 1933.

HOSPITALS AND DISPENSARIES

Hospitals, dispensaries, and other health department installations were maintained in good physical condition during the year, al-

though funds for their operation and maintenance were considerably reduced, thereby deferring the replacement of equipment. There was a considerable reduction in the number of patient days spent in Panama Canal hospitals, as indicated by the following tabulation covering the past 2 years:

	1932	1933
Gorgas Hospital.....	149,812	149,292
Corozal Hospital:		
Insane.....	253,240	172,413
Cripples and chronic medical and surgical cases.....	31,802	33,696
Colon Hospital.....	35,379	31,378
Palo Seco Leper Colony.....	38,543	34,422
Total.....	508,776	421,201

The reduction in patient days was due primarily to the transfer of approximately 600 insane patients, formerly maintained at the Corozal Hospital for the account of the Panamanian Government, to a new asylum in the Republic of Panama provided for that purpose. During 1929 military personnel accounted for 32,814 patient days in Panama Canal hospitals; in 1933 the military personnel accounted for 59,946 patient days. Due to unemployment and unfavorable economic conditions the number of patient days chargeable to charity was considerably increased during 1933. An agreement between the President of the United States and the President of Panama, providing that treatment in Panama Canal hospitals be limited to United States Government employees and their families, except in emergency, was placed in effect during October, 1933.

SMALLPOX VACCINATION

Routine vaccinations of the newborn and school children were performed during 1933. In addition the vaccination and revaccination of the general population was begun, the last general vaccination campaign having been undertaken during 1929. Since the fall of 1933 the greater part of the population of Panama City and the Canal Zone population has been vaccinated; the population of the remaining areas, including the city of Colon, is now being vaccinated, which work will be completed before the end of 1934.

QUARANTINE AND IMMIGRATION SERVICE

In spite of the world-wide depression in shipping, there was an increase in the work of the quarantine division during this fiscal year. Inspection was made of a total of 6,523 vessels and 497 airplanes as compared with 5,258 vessels and 460 airplanes during the preceding year.

The established practice of expeditious and efficient quarantine procedure was maintained by this division. It was necessary to detain one vessel on account of the presence on board of an apparently quarantinable disease at time of arrival. As has been the case since the opening of the Canal to traffic, particular attention has been directed against the possible introduction of plague into the Canal Zone.

Immigration matters (except Chinese) are handled by the quarantine division for both the Canal Zone and the Republic of Panama. During the year 66 persons who were detained or investigated were subsequently permitted to enter, while 814 were deported under provisions of the immigration laws.

The activities of the quarantine division during the fiscal year 1934 are summarized as follows:

Vessels inspected and passed-----	6,335
Vessels granted pratique by radio-----	188
Total-----	<u>6,523</u>
Crew passed at quarantine-----	367,548
Crew passed by radio-----	58,966
Passengers passed at quarantine-----	122,186
Passengers passed by radio-----	9,430
Total-----	<u>558,130</u>
Airplanes inspected and passed-----	497
Crew of airplanes inspected and passed-----	1,572
Passengers of airplanes inspected and passed-----	2,182
Total-----	<u>3,754</u>
Vessels detained in quarantine-----	1
Crew detained on board ship for quarantine-----	57
Immigration cases admitted to station-----	859
Number of detention days-----	4,857
Persons held for investigation and released-----	66
Persons deported under immigration laws-----	814
Supplementary inspection of vessels-----	3,425
Vessels fumigated-----	39
Box cars fumigated-----	137
Revenues:	
Subsistence-----	\$7,587.81
Night quarantine inspections-----	6,770.00
Fumigation charges-----	2,244.64
Special inspections-----	205.00
Credit from sale of acid and carboys-----	355.00
Total-----	<u>17,162.45</u>

Rations issued:

Cabin passengers-----	145
Steerage passengers-----	4,718
Gold employees-----	406
Silver employees-----	4,313
Total-----	9,582

MUNICIPAL ENGINEERING

Municipal work carried on during the year included the construction and maintenance of roads, streets and sidewalks, and maintenance and operation of water and sewer systems, etc. Various construction jobs were performed for the departments and divisions of the Panama Canal, the Army and Navy, and the Republic of Panama, and for individuals and companies.

WATER SUPPLY

Consumption of water for municipal uses during the past 3 years has been as follows:

	1932	1933	1934
	<i>Gallons</i>	<i>Gallons</i>	<i>Gallons</i>
Canal Zone-----	3,158,818,190	3,334,065,110	3,040,224,000
City of Panama-----	1,503,511,000	1,485,666,000	1,400,882,000
City of Colon-----	727,158,000	759,279,000	745,340,000
Sales to ships-----	157,333,310	155,756,390	169,787,000
	5,546,820,500	5,734,766,500	5,356,233,000

The quantity of water pumped at each of the pumping stations during the year, the average pumped per month, and the average cost of pumping per 1,000 gallons are shown in the following tabulation:

Pumping station	Total gallons pumped during year	Average gallons per month	Average cost per 1,000 gallons for pumping
Gamboa, U. S. No. 1-----	3,386,525,000	282,210,400	\$.0223
Miraflores, U. S. No. 2-----	453,930,000	38,249,000	.0271
Balboa, U. S. No. 3-----	2,531,453,000	210,954,000	.0188
Paraiso-----	72,783,000	6,065,000	.0472
Mount Hope-----	1,797,793,000	149,735,333	.0207
Aqua Clara-----	324,868,000	27,072,333	.0730
Monte Lirio-----	1,620,650	131,970	.6584
Frijoles-----	4,568,150	380,679	.2891
Total-----	8,578,600,800	714,801,715	-----

The usual maintenance work was performed on pipe lines, water mains, reservoirs, filtration plants, and pumping stations during the year. All pumps are electrically driven except those at Frijoles and Monte Lirio, which are driven by gasoline engines. Monte Lirio and Frijoles also have auxiliary windmills which operate when there is sufficient wind movement.

SEWER SYSTEMS

The usual maintenance work was performed on the sewer systems, and also three new sewer pumps were installed in New Cristobal during the year.

ROADS, STREETS, AND SIDEWALKS, CANAL ZONE

The usual maintenance work was performed on roads, streets, and sidewalks, and in addition the following expenditures were made from special allotments:

Bolivar Highway.—The work of repaving and widening of Bolivar Highway, extending between Cristobal and Gatun, was continued during the year. A total of 4,085 lineal feet of new concrete slab of 20- and 27-foot widths was placed, in addition to the placing of 3,410 lineal feet of 6-foot sidewalk and 8,170 lineal feet of standard curb, and the necessary earth grading and rearrangement of manholes, fire hydrants, and street lights.

New town site, Gatun.—During January 1934 plans were approved covering a new town site at Gatun, involving a considerable amount of grading in order to prepare the site for laying out of streets and for building construction. The greater part of the grading for this project was completed during the dry season, when approximately 150,000 cubic yards of earth were moved for an average distance of 450 feet, involving an average depth of cut and fill of about 20 feet. The project, when completed, will cover an area of 10.5 acres and contemplates the accommodation of approximately 37 houses. During May and June excavation was completed for roadways and 4,345 square yards of standard 18-foot concrete road were constructed. At the close of the fiscal year a roadway across the new area had been completed, joining Bolivar Highway at each end.

CRISTOBAL DRYDOCK

The reconstruction of the Cristobal drydock, begun during the fiscal year 1933, was completed during the present fiscal year. The cofferdam was removed during October 1933 and the drydock was opened for use on December 13, 1933, when two converted submarine chasers and a United States Navy houseboat were docked for repairs. The drydock, as enlarged, will accommodate vessels 366 feet long or more, up to 58 feet beam, and drawing nearly 21 feet of water. The present dimensions are as follows: Length from head to the inside of caisson along the center line, 386 feet; width of entrance at top, 66 feet; and at bottom, 65 feet; with three altars on each side, each 2 feet 6 inches wide; elevation at top of dock, 7 feet

above sea level; elevation of bottom of dock, 25 feet below sea level; of sill, 22 feet; and of keel blocks, 21 feet below mean sea level.

CONCRETE WHARF AT DOCK 15, CRISTOBAL

Soon after the beginning of the fiscal year work was begun on the construction of 475 feet of a proposed 800-foot wharf at Cristobal, this being a continuation of the south approach wall of the Cristobal drydock. As designed, the wharf has a 40-foot-wide reinforced concrete deck resting on reinforced concrete cylindrical piers 6 feet in diameter.

The construction of this extension was the first project begun under the Public Works Administration on the Isthmus of Panama, and the work was performed under the provisions of the National Recovery Act providing for a maximum of 30 hours per week. At the peak of the construction period approximately 75 Americans and 275 aliens were employed.

Steel shells 6 feet in outside diameter were fabricated in the Cristobal shops in lengths ranging from 18 to 24 feet. These piers were sunk by the open-caisson method, with the exception of 14, which were built inside the cofferdam provided for the construction of the drydock. The shells were sunk into good rock and excavation carried 3 feet below the shell. Rock was found at depths ranging from 12 to 50 feet below water. The piers were filled with concrete, a total of 2,441 cubic yards of concrete being placed in 57 piers. In addition, 2,075 cubic yards of concrete were poured in the deck and 564 cubic yards in the anchor, making a total of 5,080 cubic yards of concrete used in the entire wharf extension. At the close of the fiscal year the 475-foot extension was complete except for dredging in front of the wharf and fender system.

CITIES OF PANAMA AND COLON

The usual maintenance work was performed on the water and sewer systems and the streets and sidewalks during the year. In Colon the most important project carried out was the rebuilding of Fourth Street, between Melendez Avenue and Bolivar Avenue. In Panama City considerable reconstruction work was performed on Thirteenth Street, and installation of a considerable quantity of 10-inch pipe along Twenty-sixth Street.

WATER-PURIFICATION PLANTS AND TESTING LABORATORY

All water-purification plants were in operation throughout the year in the purification of water used on the Canal Zone and in the

cities of Panama and Colon. The testing laboratory carried on a variety of work, making a total of 6,239 tests in connection with 3,487 varied samples, including asphalt, cement, concrete, electrolyte for storage batteries, gas, gasoline, water, kerosene, metals and minerals, oils (fuel, Diesel, and lubricating), paint, rock, sand, soil, and clay, etc. The principal items tested were water, 2,956; concrete test cylinders, 1,394; oils, fuel and Diesel, 753; gasoline, 250; and cement, 192.

FERRY SERVICE

The ferry service at the Pacific entrance, connecting La Boca on the east bank of the Canal with the Thatcher Highway on the west bank was operated by the dredging division throughout the year on a regular schedule of 24 round trips daily, from 6 a. m. to 9 p. m., including Sundays and holidays, excepting when additional ferry service was assigned to meet unusually heavy traffic demands. During the year the service made 19,570 trips, carrying 6,405 Panama Canal, 7,197 United States Army, and 159,919 other vehicles, a total of 173,521, as compared with 147,104 during the previous fiscal year. By months the total ranged from 10,702 during November to 20,455 during March. Passengers carried totaled 926,617, as compared with 837,174 for the preceding year, and ranged from 55,609 during November to 111,450 in March.

PUBLIC ORDER

The number of persons placed under arrest during the year was 2,806, of whom 2,652 were males and 154 females, as compared with 2,689 males and 122 females, a total of 2,811, in the preceding year. Of the arrests during the past year, 2,395 were made without warrants and 411 were made with warrants.

The more common causes of arrest were violation of vehicle and traffic regulations, 1,130; immigration regulations, 281; loitering, 481; disturbing the peace, 215; petit larceny, 148; and fugitives from justice, 116. The persons arrested included nationals of 72 countries and territories and were of 141 different trades and professions.

Five arrests were made of persons for violation of the Narcotic Drugs Import and Export Act, one of whom was convicted in the courts and sentenced to serve a term of 6 months' imprisonment in addition to payment of a fine.

Homicides totaled 10 during the year. Seven were due to automobile accidents, including 6 cases of persons struck by automobiles; 2 were due to injuries inflicted by machete knives, in both of which cases sentences on the charge of second-degree murder were later imposed; and 1 was the result of gunshot wounds received by a con-

vict of the penitentiary when he assaulted and severely wounded with a machete 2 police officers in charge of a convict grass-cutting gang near the penitentiary.

Suicides during the year numbered 4, of which 2 were by cyanide poisoning, 1 by cutting his throat with a razor, and 1 by shooting. The coroner investigated 65 deaths during the year, 23 of which were from accidental drowning and 14 from natural causes. There was one death from snake bite during the year, species of snake being undetermined.

The number of prisoners serving sentence in the common jails at the end of each month averaged 50. All prisoners who were physically able were employed on municipal work, public improvements, janitor and miscellaneous work at the police and fire stations, and at target ranges. The total value of such common jail labor for the year is estimated at \$19,282.20.

Thirty-seven convicts were committed to the Canal Zone penitentiary during the year, with sentences aggregating 149 years; a total of 44 was discharged, of whom 1 was pardoned. At the close of the fiscal year 60 convicts remained in custody, as compared with 67 at the end of the preceding fiscal year. Labor performed by convicts during the year was valued at \$22,881.60 on the basis of standard rates of pay. Convicts were employed principally on municipal improvements, clearing trails, road work, and the cultivation of fruits, vegetables, etc., at the penitentiary farm and the experimental farm at Summit. The total value of fruits, vegetables, and other products of the penitentiary farm amounted to \$5,055.61.

Fifty-five persons were deported from the Canal Zone during the year. Of this number 39 were convicts who had completed terms of imprisonment and 16 were persons who had been convicted of misdemeanor charges or who were deemed undesirable persons to be permitted to remain in the Canal Zone.

Continuous patrol of the harbors of Balboa and Cristobal was maintained, principally for the enforcement of navigation laws and regulations and for the prevention of smuggling and irregular traffic. A police launch was maintained at Gamboa for the patrol of the Chagres River and the Canal in the vicinity of Gamboa. Another launch was maintained at Gatun for the patrol of Gatun Lake and inspection of the 100-foot contour area to determine if any unauthorized clearings or cultivation were being made, buildings erected, etc. Motorcycle patrols for the enforcement of vehicle-traffic regulations and for special emergency police service were continued throughout the year over all the streets and roads of the Canal Zone.

Traffic accidents reported in the Canal Zone during the year totaled 391. These resulted in the death of 10 persons and injuries to 135.

A classification of accidents of all kinds shows that practically all of these accidents were avoidable and were largely due to careless and reckless operators.

Detective officers effected 136 arrests and, in addition, made 1,088 investigations in cases of various natures to obtain information in criminal cases and the whereabouts of persons wanted in other jurisdictions.

The usual routine work was carried on by the criminal identification bureau during the year.

FIRE PROTECTION

During the year 118 fires and 13 false alarms were reported. Of these, 72 occurred in property of the Panama Canal, 17 in Panama Railroad property, 2 in United States Army property, 2 in United States Navy property, and 25 in private property. The total estimated loss from all fires during the year amounted to \$7,088.43, of which \$1,945.37 was in Panama Canal property, \$735.06 in Panama Railroad property, \$250 in United States Army property, \$12 in United States Navy property, and \$4,146 in private property. The total value of property involved was \$1,147,738.06.

Periodical inspections of all Government buildings, docks, storehouses, etc. were made and fire extinguishers and other equipment maintained in good condition throughout the year. Fifty-six fire extinguishers and 2,000 feet of fire hose were added to the fire-protection equipment as replacements.

DISTRICT COURT

By Executive order of November 3, 1933, based on Executive Order No. 6166 of June 10, 1933, supervision of the United States District Court for the District of the Canal Zone was transferred from the War Department to the Department of Justice.

Regular sessions of the district court were held in both Balboa and Cristobal. The following is a summary of the cases handled during the period from July 1 to November 3, 1933:

	Civil	Probate	Criminal	Total
Cases pending July 1, 1933-----	62	105	27	194
Cases filed during period-----	40	67	30	137
Total-----	102	172	57	331
Cases settled during period-----	52	118	50	220
Cases pending Nov. 3, 1933-----	50	54	7	111

Of the civil cases disposed of, 43 were decided and 9 dismissed; of the criminal cases disposed of, 37 were convicted, 1 was acquitted and 12 were dismissed.

Marriage licenses issued numbered 278 and collections from fines, fees, licenses, etc., totaled \$1,174.84.

The public defender, in conformity with the authority conferred by the act of Congress approved July 5, 1932, continued to represent in the District Court of the Canal Zone those persons charged with the commission of a crime within the original jurisdiction of such court who were unable to employ counsel for their defense. During the fiscal year the defense was represented by the public defender in 43 cases involving a like number of persons prosecuted in the district court.

OFFICE OF THE DISTRICT ATTORNEY

During the period from July 1 to November 3, 1933, the date on which supervision of the United States District Court for the District of the Canal Zone was transferred to the Department of Justice, the district attorney and his assistant prosecuted 49 criminal cases before the district court, and 6 criminal cases were pending on the latter date. Of the 49 cases prosecuted, 13 were for burglary, 7 for embezzlement, 7 for taking vehicle without owner's permission, 4 for returning to the Canal Zone after having been deported therefrom, and 3 for violation of the Narcotic Drugs Import and Export Act.

UNITED STATES MARSHAL

During the period from July 1 to November 3, 1933, the date of transfer of supervision of the district court to the Department of Justice, there were filed and pending from the previous year in the district court a total of 331 cases, of which 102 were civil, 172 were probate, and 57 were criminal. In the civil and probate cases there were 25 summonses and complaints, 59 subpenas for witnesses, 3 citations, 2 civil executions, 1 warrant of seizure, 2 restraining orders, 1 order of examination of judgment debtor, and 1 writ of ne exeat republica. In admiralty there were handled 3 writs of execution and 1 citation. Two special cases were handled for attorneys in the United States. In the criminal cases, 26 mittimus (penitentiary and common jail) were handled and 47 subpenas for witnesses and 2 bench warrants were issued. Two juries were summoned during the period.

Trust funds received and disbursed amounted to \$556.33. Revenues collected amounted to \$114.28 and fees paid to witnesses and interpreters amounted to \$83.20.

MAGISTRATES' COURTS**BALBOA**

In the magistrate's court for the town and subdivision of Balboa 20 cases were pending at the beginning of the fiscal year, 1,722 cases were docketed, and 1,734 cases were disposed of during the year, leaving 8 cases pending. Of the cases disposed of, 57 were civil and 1,677 were criminal. In the latter, 1,369 resulted in conviction, 154 in acquittal, 100 were dismissed, and 54 were held to the district court. Fines, costs, and forfeitures totaled \$4,810.63.

Under the provisions of the Penal Code of the Canal Zone, as amended, imposition or execution of sentence was suspended in 63 cases and defendants placed on probation.

CRISTOBAL

In the magistrate's court for the town and subdivision of Cristobal 3 cases were pending at the beginning of the fiscal year, 965 cases were docketed, and 961 cases were disposed of during the year, leaving 7 cases pending. Of the cases disposed of, 43 were civil and 918 were criminal. In the latter, 807 resulted in conviction, 54 in acquittal, 21 were dismissed, 34 were held to the district court, and 2 were extradited.

Under the provisions of the Penal Code of the Canal Zone, as amended, imposition or execution of sentence was suspended in 59 cases, of which 14 defendants were rearrested for violating the terms of probation and were returned to serve the sentences originally imposed.

PARDONS AND REPRIEVES

During the year 23 applications for executive clemency were considered. Of these, 5 applications were approved and 17 were denied and 1 case was pending at the end of the year.

Prior to February 16, 1933, the pardoning power of the Governor was limited to those cases wherein an affirmative recommendation had been made by a majority of the members of the pardon board; however, effective as of the above date Congress placed this power directly with the Governor. The pardon board now acts in an advisory capacity. It consists of five members.

PUBLIC SCHOOL SYSTEM

During the year, 2 senior high schools, 2 junior high schools, and 6 elementary schools for white children and 8 elementary schools for colored children were maintained. All elementary schools are graded. The elementary schools for white children are located at

Ancon, Balboa, Pedro Miguel, Gatun, Paraíso, and Cristobal. Schools for colored children are located in La Boca, Red Tank, Paraíso, Gamboa, Gatun, Frijoles, Chiva Chiva, and Cristobal. The school organization is comparable with the usual city school system in the United States, having a superintendent with assistants in general charge and a principal at each school; in the Canal Zone the schools are situated in the various towns rather than in sections of a city.

The number of pupils on the roll at the end of February 1934, taken as representative, was 3,014 (including the junior college) for the white schools and 3,744 for the colored schools, a total of 6,758. This was an increase of 0.7 percent for the white schools and a decrease of 10 percent for the colored schools and a 5 percent decrease for the total. The net enrollment for the fiscal year was 3,170 white and 4,128 colored, as compared with 3,264 white and 4,568 colored in the preceding year. The average daily attendance at the white schools was 2,790.2 and at the colored schools 3,585.8; a total of 6,376.

The per capita expense of maintenance, based on average daily attendance, amounted to \$343.03 for the first year of operation of the junior college. The per capita expense for the balance of the schools was \$56.23, as compared with \$58.20 for the preceding year. The total expenditures for the division of schools was \$358,503.75, as compared with \$392,531.52 for the preceding year. Tuition collected, books and school material sold, etc., amounted to \$18,486.59.

The teachers corps of the Canal Zone schools during the year was composed of 8 principals and 106 teachers for the white schools and 8 principals and 83 teachers for the colored schools. The usual high standards as to educational qualifications were exacted in the employment of new teachers. The supervisory staff was reduced by the suspension of two positions, director of health and physical education and director of vocational education in the colored schools. These reductions were effected as economy measures.

The Canal Zone Junior College was opened on September 25, 1933. Sixty-two students enrolled for the freshman year. The work of the junior college was formally accredited by the American Association of Junior Colleges. It is expected that the new junior college building will be occupied at the beginning of the next school year in September. Receipts from the first year amounted to \$10,314.46. The total expenses amounted to \$19,214.12, of which the greater part was expended for permanent equipment, such as furniture, apparatus, and library books. The junior college has a faculty of five instructors.

Many classes in the colored schools enroll as many as 50 pupils. This is not a very satisfactory situation and should be remedied as

soon as funds can be secured to reduce the size of these classes to a maximum of 45. Vocational education in the colored schools has progressed with very satisfactory results.

POSTAL SYSTEM

The 13 post offices open at the beginning of the year were continued in operation. The gross receipts for the postal service were \$315,516.32, as compared with \$297,082.22 for the previous fiscal year, an increase of \$18,434.10, or 5.84 percent. The expenditures aggregated \$254,825, as compared with \$195,542.87 during the previous year, an increase of \$59,282.13, or about 30 percent. This increase in expenditures is due to the setting aside of \$56,000 to pay the United States Post Office Department for the transportation of Canal Zone air mail during the fiscal year. The receipts exceeded the expenditures by \$51,946.39, or 16.46 percent, after further deducting \$8,844.93, representing accrued interest on deposit money orders remaining unpaid at the end of the year.

The sale of postage stamps, postal cards, stamp books, etc., amounted to \$201,777.04 of the total receipts above mentioned.

The practice of issuing deposit money orders in lieu of postal savings certificates was continued. During the year 28,845 deposit money orders were issued, amounting to \$1,757,580, compared with 29,913 issued during the previous year, totaling \$1,959,747. A total of 27,945 deposit money orders was paid, in the amount of \$1,732,-715, compared with 24,349 the previous year, which amounted to \$1,519,897. The balance to the creditors in the deposit money order system increased from \$1,650,540 at the close of the last fiscal year to \$1,717,530 at the close of the 1934 fiscal year. Since 1920 there has been paid to depositors as interest on deposit money orders the amounts of \$210,570.61. Interest received during the same period amounted to \$448,465.38, a difference of \$237,894.77. Deducting \$41,679.71, representing interest due on unpaid deposits as of June 30, 1934, there is a surplus of \$196,215.06.

There were 176,429 money orders, including deposit money orders, issued during the year, amounting to \$4,328,238.47 on which fees amounting to \$15,332.40 were collected. Compared with the preceding fiscal year there was an increase of 1,092 in the number of orders issued, and a decrease of 26.99 percent in the amount of fees collected.

In the registry division of the post offices 199,200 letters and parcels were handled, as compared with 210,044 for the previous fiscal year. Of this total, the articles dispatched numbered 98,328, divided as follows: 21,819 domestic letters, 131 domestic parcels registered, 26,326 foreign letters registered, 3,571 foreign parcels registered, 40,853 official mail (registered free), and 5,628 c. o. d. and insured parcels.

During the year 2,710 dispatches of mail were made by the Cristobal post office to the United States and foreign countries, subdivided as follows: (a) by steamers to the United States, 511 dispatches; (b) by steamers to foreign countries, 2,199 dispatches. Dispatches numbering 1,060 were received from the United States by steamer and 2,740 from foreign countries. Balboa post office, which dispatches mail to the west coast exchange offices of the United States and Central and South America, made 2,162 and received 1,599 dispatches during the year.

AIR MAIL

The air-mail schedules to and via the Canal Zone remained unchanged throughout the year and dispatches were made with regularity. The schedules continue to be well maintained despite the hazards of the long flights. No change was made in the air-mail postage rates to foreign countries during the year but notice was received during June of a downward revision in the rate for United States domestic service to become effective at the beginning of the next fiscal year. The volume of Canal Zone air mail handled to and via the United States remained practically unchanged during the year but a decrease of about 3 percent was noted in the amount dispatched to South American countries.

The Cristobal post office continued to handle all air mail exchanged between the United States and the west coast of South America. The volume of this mail was about 16 percent more than in the preceding year. The number of dispatches forwarded during the year was 5,005 and 8,352 were received, compared with 4,874 forwarded and 6,410 received during the preceding year. This handling entails a considerable amount of work performed for the United States Post Office Department in the preparation and recording of detailed particulars involving the numerous small packages containing only a few letters which comprise a large portion of these dispatches.

Transportation charges on Canal Zone air-mail matter dispatched during the year on the basis of prescribed rates aggregated \$63,978.27. It is estimated that the expense involved locally in connection with the handling of United States air-mail matter to and from South America amounts to \$600 per month. Heretofore no payment has been made for the transportation of air-mail matter from the Canal Zone as no appropriation was authorized therefor. As the bureau of posts is now permitted to operate separately on its own revenue the transportation of air-mail matter is an obligation that must be met, beginning with the current fiscal year. In the circumstances the sum of \$56,000 was set aside in the suspense account to cover the

estimated net amount due the United States Post Office Department for air-mail transportation during the fiscal year 1934.

NEW LEGISLATION

The act of Congress of February 16, 1933, providing for the operation of the Canal Zone postal service under the direct control of the Governor and the use of postal revenues to cover the operating expenses of the service became effective at the beginning of the fiscal year. This year there was a surplus of \$51,946.39 over the cost of operation after deducting the estimated amount of \$56,000 due for the transportation of air mail. It is not believed that any surplus should be converted into the Treasury until reasonable operation reserves have been established and studies are being made as to the desirability of setting up reserves, both to provide additional safeguards to investment of Postal Savings funds and for the replacement of obsolete buildings.

CUSTOMS

The various activities of the bureau of customs were continued along the lines explained in previous reports. The following is a statistical summary of the principal items, with the figures for the preceding year shown for comparison:

Item	Fiscal year	
	1933	1934
Vessels entered.....	9,678	12,066
Vessels cleared.....	9,670	12,061
Total.....	19,348	24,127
Vessels of United States registry entered.....	3,818	5,081
Vessels of United States registry cleared.....	3,815	5,078
Customs releases on shipments consigned to Panama (Cristobal, 9,444 and Balboa 583).....	9,474	10,027
Free entry releases for shipments to employees of United States Government.....	5,532	4,579
Arrests for violations of Narcotic Drug Import and Export Act.....	4	5
Arrests for violations of the customs regulations.....	0	0
Shipments of household goods of employees of United States, inspected and sealed for shipment to United States.....	96	108
Pieces of freight included in above.....	668	1,066
Invoices certified for shipment to United States.....	704	459
Special customs inspections out of regular hours:		
Cristobal.....	379	603
Balboa.....	322	419
Total.....	701	1,022
Fees collected for above.....	\$4,715.87	\$6,278.25
Cargo deposited to be held for orders ("Canal Zone for orders"):		
Cristobal:		
Consignments received.....	1,253	573
Releases for delivery or forwarding.....	9,154	4,396
Balboa:		
Consignments received.....	485	276
Releases for delivery or forwarding.....	3,176	1,758
Chinese passengers arriving.....	653	682
Admitted to Panama.....	264	268
Vessels with Chinese crews checked.....	540	638

SHIPPING COMMISSIONER

The shipping commissioner and his deputies have the same powers as shipping commissioners in United States ports and United States consuls in foreign ports with respect to United States seamen. During the year there were 2,094 seamen shipped on vessels of the United States and 1,992 discharged. No sick or destitute seamen were returned to the United States at the expense of the appropriation for the relief of destitute American seamen, but 178 were signed on vessels as seamen or workaways and returned to the United States without expense to the Government.

Wages earned by seamen discharged at Canal Zone ports aggregated \$48,104.07; the total approved for deductions on account of advances, allotments, fines, slop-chest account, etc., was \$10,532.82, and \$37,571.25 was either paid to seamen under the supervision of the deputy shipping commissioners or received on deposit for the seamen by the deputy shipping commissioners. The wages, money, and effects of one American seaman who died in a Canal Zone hospital were handled by the shipping commissioner during the year. The wages, money, and effects of this seaman were remitted to the proper court in the United States for disposition. The amount of such case handled was \$559.50.

ADMINISTRATION OF ESTATES

Under the new code of civil procedure, effective October 1, 1933, the office of public administrator was established in lieu of the former office of administrator of estates. While formerly the administrator of estates handled only estates of intestate Panama Canal or Panama Railroad employees, the public administrator now takes charge of all estates within the Canal Zone which require administration and are not administered by others legally entitled to administer them. In the case of estates with total assets exceeding \$1,000 in value the public administrator under the new law charges the regular commissions fixed by law which are paid into the Treasury of the United States. Commissions amounting to \$169.07 were collected during the fiscal year. The estates of 96 deceased or insane persons were settled, as compared with 102 estates settled during 1933. On June 30, 1934, there were 16 estates in course of administration. The amount involved in the settlement of the 96 estates was \$18,782.17.

LICENSES AND TAXES

Licenses issued for motor vehicles, permits for peddling foodstuffs, the sale of merchandise generally, ship's runners, and similar purposes numbered 9,781 for the year.

The number of motor-vehicle licenses and transfers, and miscellaneous licenses issued during the past 10 years, and the aggregate fees collected therefor are summarized below. These include licenses for official vehicles.

Year	Motor-vehicle licenses	Motor- vehicle transfers	Bicycle licenses ¹	Miscel- laneous licenses	Total	Fees
1925-----	3,464	1,026	1,024	1,387	6,901	\$25,061.41
1926-----	4,185	1,192	539	1,562	7,478	30,126.90
1927-----	5,107	1,391	1,074	1,327	8,899	34,731.79
1928-----	5,543	1,490	806	1,070	8,909	36,875.89
1929-----	6,345	1,729	17	1,076	9,167	40,894.39
1930-----	7,280	1,862	1	1,063	10,206	45,603.84
1931-----	8,128	2,083	-----	1,443	11,654	51,295.46
1932-----	8,577	1,906	2	1,310	11,795	52,143.07
1933-----	8,432	2,270	-----	1,155	11,857	50,038.54
1934-----	8,389	2,311	-----	1,392	12,092	52,795.70

¹ 1 Bicycle licenses not required since 1928 except on bicycles in official use.

FOREIGN CORPORATIONS

Effective October 1, 1933, foreign corporations doing business in the Canal Zone were required to secure licenses, and for the fiscal year \$1 such corporations, the majority of which are steamship lines and steamship agencies, were licensed, and fees amounting to \$1,480 were collected. Corporations paid taxes amounting to \$142.49.

INSURANCE

The license fee for insurance companies doing business in the Canal Zone was reduced last year from \$50 to \$10, and at the end of the fiscal year 11 companies had been given licenses. These companies reported that as of December 31, 1932, 678 policies were in force. During the calendar year 1933, 145 policies were issued and 135 canceled, leaving 688 in force as of December 31, 1933. The policies in force as of December 31, 1933, had a face value of \$2,007,144, on which premiums of \$85,274.12 were collected.

During the calendar year 1933, the premiums received by miscellaneous insurance companies, including accident, auto liability, fire, surety, fidelity, etc., but excluding life insurance, amounted to \$104,412.68. Losses paid during the year totaled \$38,312.12.

The tax on premiums of all classes of insurance companies amounted to \$2,846.74 for the fiscal year 1933, as compared with \$2,463.71 during the previous year.

One company terminated its Canal Zone business and two new companies were issued licenses.

IMMIGRATION VISAS

During the year 26 visas were issued by the executive secretary to alien residents of the Canal Zone going to the United States.

Of these, 3 were quota visas, 16 were nonquota visas, and 7 were nonimmigrant. Fees collected for visas amounted to \$232.

RELATIONS WITH PANAMA

During the year direct correspondence was conducted between the Governments of the Canal Zone and the Republic of Panama with reference to various matters of joint interest, arising from the relations of the two Governments and the proximity of their respective areas. Most of this correspondence was of a routine nature, dealing with problems relating to aviation, customs duties, inspection, extradition, garbage collection, immigration, automobile licenses and registration, municipal improvements, annual and complimentary passes over the Panama Railroad, public health, schools, vital statistics, police and court records, etc., while matters of less routine nature included registrations or repatriation of aliens, proposed locations in the Canal Zone for Panamanian customs offices, proposed tax on Panama Railroad Steamship Line cargo destined for the Republic of Panama, and aviation regulations.

COMMERCIAL AVIATION

Regulations to govern air navigation in the Canal Zone were revised during the present fiscal year and were promulgated by the Secretary of State on June 23, 1934.

The following shows the number of passengers carried by the various commercial airways operating in intra-Canal Zone and Canal Zone and foreign air commerce during the fiscal year 1934 as compared with the previous fiscal year:

	Pan American Airways, Inc. (including U. M. C. A.)	Pan American Grace Airways, Inc.	Isthmian Airways, Inc.
NUMBER OF PASSENGERS			
Canal Zone and foreign:			
Incoming-----	953	397	-----
Outgoing-----	878	346	-----
Approximate percent of increase-----	17	52	-----
Intra Canal Zone:			
Total passengers carried-----			10,097
Approximate percent of increase-----			46
MAIL AND AIR EXPRESS			
Air express and mail carried-----	<i>Pounds</i> ¹ 42,749 (²)	<i>Pounds</i> ² 7,315 50	-----
Approximate percent of increase-----			-----

¹ Covers period from Jan. 1 to June 30, 1934.

² Does not include mail carried.

³ Previous figures not available.

CODIFICATION OF THE LAWS OF THE CANAL ZONE

Following the approval of the last of the bills providing for the revision of the laws of the Canal Zone in February 1933, the task of compiling and codifying the laws as revised, as authorized by the act approved May 17, 1928, was begun in the Washington office of the Panama Canal on July 3, 1933, by Paul A. Bentz, codifier appointed by order of the President.

The revision and codification was completed in April 1934, and the Canal Zone code was thereupon submitted to Congress for its approval. The code was passed by both Houses of Congress without change and was approved on June 19, 1934. The code becomes effective 90 days after the date of approval.

There remained at the end of the fiscal year only the completion of the index to the code and the binding of the code and the appendices thereto. It is expected that this will be completed in October or November 1934. Thereupon the codifier will again proceed to the Canal Zone for the purpose of effecting a revision of the Executive orders relating to the Panama Canal and the Canal Zone.

SECTION V

FINANCIAL AND STATISTICAL STATEMENTS

Financial statements of major interest relative to the Panama Canal are presented in this section. These statements are abstracted from the annual report of the accounting department.

ACCOUNTING SYSTEM

The accounting system inaugurated in 1932 on the recommendation of the Bureau of Efficiency to conform as far as practicable to the principles and practices approved by the Interstate Commerce Commission and State boards regulating public utilities was continued in effect during the fiscal year 1934 with such minor changes as were necessary to conform to changing conditions.

The accounting system fixes July 1, 1921, as the close of the construction and development period of the Panama Canal, and all interest on United States Treasury funds advanced up to that date has been capitalized. Capital interest subsequent to that date, while not included on the balance sheet, is considered as a statistical charge to operating expenses for comparison with net revenues. Additions to the capital-investment account are made from time to time by the inclusion of the cost of new capital additions (such as Madden Dam); deductions are made of the amounts of withdrawals and retirements of capital assets, such as through the sale of property or the absorption of value of buildings or equipment through charges for depreciation.

Based on the foregoing principles, the capital investment at the beginning of the fiscal year 1934 stood at \$539,200,059.23. Interest at 3 percent on this amount is \$16,176,001.78, and such interest is considered a charge to operating expenses for the year.

At the end of the fiscal year 1934, following the same principles, the capital investment was \$543,744,707.09, and the interest charge for the fiscal year 1935 will be computed from that amount.

The net revenues of the Canal during the fiscal year 1934 amounted to \$16,810,348.06 on Canal operations and \$1,366,755.12 on business operations, a total of \$18,177,103.18. With respect to the capital investment of \$539,200,059.23 at the beginning of the year, this revenue represents a return of 3.37 percent. The corresponding figure for 1933 was 2.23 percent. The net revenue exceeded the 3-percent in-

terest charge by \$1,366,755.12. This very gratifying return for the fiscal year 1934 is due largely to a sharp reduction in operating expenses which is not likely to occur in following years. This is explained more fully in the opening remarks of this report under "Revenues and expenses."

OPERATIONS WITH PANAMA RAILROAD CO.'S FUNDS

The results from the operations of the railroad proper and its various business units on the Isthmus are shown in detail in the accounts of the Panama Railroad Co., and detailed statement of revenue, expenses, and statistics of all railroad industries, changes in the capital account, and the results from the operations of the steamship line, appear in the regular annual report of the Panama Railroad Co. Inasmuch as these activities are related closely to the operation of the Panama Canal major facts with regard to them are summarized in the report of the Canal.

The operations of the railroad proper, harbor terminals, coaling plants, stables, and baggage transfer, were continued throughout the fiscal year under the direction of the general manager; the telephone system under the electrical engineer of the Panama Canal; renting of lands and buildings under the land agent; and the hotels, commissaries, plantations, dairy farm, and cattle industry, under the chief quartermaster of the Panama Canal. A review of these activities is presented in section II of this report under the heading "Business operations under the Panama Railroad Co."

The net result from all Panama Railroad operations on the Isthmus during the fiscal year 1934 was a profit of \$1,156,738.14, as compared with \$784,432.28 for the preceding year, an increase of \$372,305.86 for the year.

PANAMA CANAL OPERATIONS

The major financial results of Panama Canal operations are presented hereinafter in tables nos. 1 to 27, inclusive, with supplementary comments and explanations.

The following is a list of all of the tables and bureau reports contained in the annual report of the accounting department. The tables and reports nos. 28 to 59, inclusive, are not published because they are concerned principally with details of operations which lack general interest, and their publication would be an unwarranted expense. The complete report for the accounting department, as well as those of the other departments and divisions, may be consulted at the office of the Governor or at the Washington office of the Panama Canal. For purposes of reference the complete list of tables and re-

ports for the accounting department is published below. Following the list are presented the major tables nos. 1 to 27, inclusive, with various notes of explanation.

GENERAL BALANCE SHEET

ASSETS

Table no.

1. General balance sheet.
2. Canal fixed property and equipment.
3. Administrative and civil property.
4. Business fixed property and equipment.
5. Public works, Republic of Panama.
6. Revenues due United States Treasury.
7. Security deposit funds.
8. Independent trust funds.
9. Cash receipts and disbursements.
10. Accounts receivable registered and outstanding.
11. Stores.
12. Work in progress.
13. Deferred charges.

LIABILITIES

14. Capital investment.
15. Accounts payable.
16. Reserve for replacements.
17. Reserve for repairs.
18. Operating reserve.
19. Deferred credits.
20. Income, expenses, and net revenue (current).
21. Revenues, expenses, and computed surplus.
22. Capital refundments (miscellaneous receipts and Canal appropriations)
23. Balance of revenues and refundments.

DETAILS OF OPERATIONS FOR PROFIT AND LOSS

(Summaries on tables 20 and 21)

24. Canal revenues.
25. Canal earnings, expenses, and net revenues.
26. Business revenues, expenses, and net revenues.

MISCELLANEOUS

27. Balances in appropriation and fund accounts.

ADDENDA NOT PUBLISHED

(May be seen at Balboa Heights or the Washington office of the Panama Canal—see prefatory notes.)

Table no.

28. Cost of electric current.
29. Cost of dredging.
30. Collection of United States funds by collector.
31. Money-order business, Canal Zone.
32. Postal-service revenues.

Table no.

33. Death and injury accidents and payments.
 34. Payments by the paymaster.
 35. Audited pay rolls.
 36. Pay-roll deductions, gold employees.
 37. Cost of production of water.
 38. Money-order statistics.
 39. Postal-service statistics.
 40. Clubs and playgrounds, income and expenditures.
 41. Clubs and playgrounds, balance sheet.
 42. Commissary coupons issued.
 43. Cost of commissary supplies.
 44. Rent collections from nonemployees.
 45. Land-rent collections, Panama Railroad.
 46. Silver quarters statistics.
 47. Accounts payable registered, Panama Canal.
 48. Accounts payable registered, Panama Railroad.
 49. Employees' bonds.
 50. Report of accounting bureau.
 51. Report of pay-roll section.
 52. Payments account of deaths and injuries.
 53. Report of personal-injury claims.
 54. Report of freight and cargo claims.
 55. Report of collections from silver employees.
 56. Report of general inspection bureau.
 57. Report of time-inspection bureau.
 58. Report of property-inspection bureau.

TABLE No. 1.—*General balance sheet, June 30, 1934*

ASSETS

Capital assets:	
Canal fixed property and equipment (table no. 2)-----	\$498,794.534.91
Administrative and civil property (table no. 3)-----	12,735.309.74
Business fixed property and equipment (table no. 4)-----	26,776.633.32
Total capital assets-----	\$538,306,477.97
Reimbursable capital expenditures:	
Public works, Republic of Panama (table no. 5)-----	1,318,229.12
Revenues due United States Treasury (table no. 6)-----	160,415.36
Special funds:	
Security deposit funds (table no. 7)-----	467,940.84
Independent trust funds (table no. 8)-----	2,108,059.69
Total special funds-----	2,576,000.53
Working assets:	
Appropriated cash in United States Treasury (table no. 9)-----	9,461,149.74
Appropriated cash with fiscal officers (table no. 9)-----	2,373,574.11
Accounts receivable (table no. 10)-----	683,152.31
Stores (table no. 11)-----	3,488,060.69
Work in progress (table no. 12)-----	33,045.56
Total working assets-----	16,038,982.41
Deferred charges (table no. 13)-----	85,552.50
Total assets-----	<u>558,485,657.89</u>

LIABILITIES

Capital investment:	
Net appropriations by Congress-----	400,092,346.66
Interest on appropriations-----	143,652,360.43
Total capital investment (table no. 14)-----	<u>543,744,707.09</u>
Special fund obligations (see assets)-----	2,576,000.53
Working liabilities:	
Accounts payable (table no. 15)-----	1,179,164.18

LIABILITIES—continued

Funded reserves:		
Reserve for replacements (table no. 16)-----	\$4,180,528.13	
Reserve for repairs (table no. 17)-----	967,866.49	
Reserve for vacation pay (table no. 18)-----	440,900.46	
Total funded reserves-----		\$5,589,295.08
Deferred credits (table no. 19)-----		352,094.69
Revenues and refundments:		
Net revenues to June 30, 1933-----	172,799,585.60	
Net revenues fiscal year 1934 (table no. 20)---	18,177,103.18	
Total net revenues (table no. 21)-----	190,976,688.78	
Reserve for depreciation (unfunded)-----	15,159,499.32	
Total-----	206,136,188.10	
Less capital refundments (table no. 22)-----	201,091,791.78	
Balance of revenues and refundments (table no. 23)-----		5,044,396.32
Total liabilities-----		558,485,657.89

The terms and arrangement of the foregoing balance sheet follow closely the generally accepted principles of corporate accounting, except as to the last item, "Revenues and refundments." The statutes require that receipts for tolls, civil revenues, and net profits on business operations shall be covered into the United States Treasury and relinquished from control of the Panama Canal.

Funds for current operating expenses and capital construction are appropriated by the Congress, and for accounting purposes are considered as provided from the tolls and other receipts covered into the Treasury. Practically all receipts other than those cited above are repayable to Canal appropriations, and may be reexpended, but as the Canal is deprived of tolls revenues, its principal source of income, the reexpendable receipts are insufficient to provide for operation and maintenance, thus requiring the Canal to submit its expenditure program annually to the Congress.

Total net revenues, appearing under the caption "Revenues and Refundments", represent the accumulated operating earnings of the Panama Canal before capital interest charges. This net revenue, however, has been covered into the United States Treasury in the form of tolls and other receipts. It therefore follows that net capital refundments and net revenues earned will always be approximately the same, except for the fluctuation of unexpended appropriated cash and other current items.

The item "Reserve for depreciation (unfunded)" has been charged against "Net revenues", but is restored thereto in the balance sheet exhibit because this expense is not covered by Canal appropriations, and the cash representing this reserve has therefore been covered into the Treasury in the form of tolls. This charge is made solely for the purpose of adjusting "Net revenues" to allow for depreciation of general property items which will probably not require replacement within 50 to 100 years, or longer.

The "Funded reserves", under a separate balance-sheet caption are also charged against current operations, but differ from the "Reserve for depreciation" in that these charges are included in

operating appropriations, and are therefore represented in the appropriated fund balances under "Working assets."

These various fund requirements leave the Panama Canal balance sheet without an equivalent for the usual corporate "Surplus account", since any surplus is included in the tolls covered into the Treasury by law. However, the equivalent for "Surplus account" is shown on table no. 21, which compares "Total net revenues" of \$190,976,688.78, appearing on the balance sheet, with the computed interest on the capital investment, by years, from July 1, 1922, but no interest charge against the Canal is actually made by the United States Treasury.

The general accounts in the above balance sheet are shown in detail under the table numbers listed opposite each item.

TABLE NO. 2.—*Canal fixed property and equipment, fiscal year 1934*

	Balance July 1, 1933	Additions	With- drawals	Balance June 30, 1934
CANAL FIXED PROPERTY				
Channels, harbors, and basins:				
Balboa to Pedro Miguel.....	\$24,309,928.86			\$24,309,928.86
Pedro Miguel to Gatun.....	113,416,691.77	\$50,000.00		113,466,691.77
Gatun to Cristobal.....	12,829,445.51			12,829,445.51
Breakwaters:				
Naos Island.....	1,075,874.10			1,075,874.10
Colon-East.....	3,994,727.10			3,994,727.10
Colon-West.....	4,528,829.57			4,528,829.57
Locks:				
Miraflores.....	24,586,787.54			24,586,787.54
Pedro Miguel.....	16,770,362.46			16,770,362.46
Gatun.....	37,914,498.12			37,914,498.12
Dams:				
Miraflores.....	1,228,561.63			1,228,561.63
Pedro Miguel.....	457,302.32			457,302.32
Madden.....	7,903,455.69	3,608,982.71		11,512,438.40
Gatun.....	10,475,943.56			10,475,943.56
Gatun-Mindi Levee.....	148,974.22			148,974.22
Spillways:				
Miraflores.....	1,398,684.94			1,398,684.94
Gatun.....	4,323,538.02			4,323,538.02
Aids to navigation:				
Lighthouses and beacons.....	548,769.52			548,769.52
Buoys and other markers.....	295,473.80			295,473.80
Buildings and landings.....	127,318.29			127,318.29
Wharves and piers:				
Balboa (nos. 14 to 19).....	3,317,826.59			3,317,826.59
Cristobal (nos. 6, 14, 15).....	2,332,550.24			2,684,825.22
No. 14 (part).....		46,223.13		
No. 15 (part).....		306,051.85		
Drydocks:				
Balboa.....	3,576,872.10			3,576,872.10
Cristobal.....	477,832.37			480,206.81
Drydock crane (part).....		2,374.41		
Coaling plants:				
Balboa.....	3,679,797.59			3,679,797.59
Cristobal.....	2,284,568.35			2,284,568.35
General capital expenditures:				
Purchase price new Panama Canal Co.....	131,717,335.97			31,717,335.97
Treaty payment to Republic de Panama, 1904.....	10,000,000.00			10,000,000.00
Annual treaty payments to Republic de Panama, 1913-21.....	2,250,000.00			2,250,000.00
Relocation Panama R. R.....	9,800,626.46			9,800,626.46
Reequipment of Panama R. R.....	3,247,332.11			3,247,332.11
Depopulation of Canal Zone.....	2,701,016.24			2,701,016.24
Interest during construction period.....	143,652,360.43			143,652,360.43
Total, Canal fixed property.....	485,373,285.47	4,013,632.13		489,386,917.60

¹ Original purchase price of \$40,000,000 less Panama R. R. capital stock, and sales and transfers of property acquired.

TABLE No. 2.—*Canal fixed property and equipment, fiscal year 1934—Continued*

	Balance July 1, 1933	Additions	With- drawals	Balance June 30, 1934
CANAL EQUIPMENT				
Tugs.....	\$1,400,106.24			\$1,400,106.24
Supply boats.....	51,544.48			51,544.48
Launches.....	343,508.77			332,699.73
Aspinwall, surveyed.....			\$10,809.04	
Dredges.....	2,325,906.76			2,570,236.01
Cascadas, equipment added.....		\$76,220.64		
Gamboa, equipment added.....		75,885.49		
Las Cruces, equipment added.....		16,646.78		
Paraíso, equipment added.....		75,576.34		
Lighters and scows.....	1,334,360.33			1,445,031.08
Scow No. 127, built (part).....		100,000.00		
Scows (various numbers), equipment added.....		10,670.75		
Floating cranes.....	659,524.29			659,524.29
Crane boats.....	294,821.05			517,833.70
Atlas, built (part).....		223,012.65		
Barges.....	298,538.30			320,897.70
Grader No. 21, built (part).....		22,359.40		
Ferryboats.....	255,860.15			255,860.15
Floating caisson (locks).....	347,868.15			347,868.15
Towing locomotives (locks).....	1,449,538.01			1,449,538.01
Excavator.....	17,370.00			17,370.00
Cranes.....	16,030.00			16,030.00
Marine salvage equipment.....				23,077.77
Transfer.....		23,077.77		
Reserve equipment.....	50.00			50.00
Orange-peel bucket.....				
Total, Canal equipment.....	8,795,026.53	623,449.82	10,859.04	9,407,617.31
Total, Canal fixed property and equip- ment.....	494,168,312.00	4,637,081.95	10,859.04	498,794,534.91

TABLE No. 3.—*Administrative and civil property, fiscal year 1934*

	Balance July 1, 1933	Additions	With- drawals	Balance June 30, 1934
Buildings				
Office buildings.....	\$2,015,397.02			\$2,053,731.53
Building no. 112 restaurant Pedro Miguel (transfer).....		\$38,334.51		
Gorgas Hospital.....	1,800,047.49			1,800,047.49
Corozal Hospital.....	604,992.48			556,912.16
Buildings (various, demolished).....			\$48,080.32	
Colon Hospital.....	343,290.51			314,615.86
Covered passageway.....		1,845.72		
New ward.....		7,757.57		
Building no. 314, Colon (transferred).....			38,277.94	
Dispensaries.....	170,427.88			211,324.38
Colon.....		2,618.56		
Building no. 314, Colon (transfer).....		38,277.94		
Palo Seco leper colony.....	76,928.46			76,928.46
Quarantine stations.....	63,392.70			63,392.70
Other health-department structures.....	99,446.94			97,901.94
Clubs and playgrounds.....	230,034.85			448,636.50
Building no. 365, restaurant, Ancon (trans- fer).....		79,887.33		
Basement building no. 905, Silver Mess, La Boca (transfer).....		12,193.63		
Building no. 1603 restaurant, Cristobal (transfer).....		86,517.21		
Addition to Balboa clubhouse.....		12,323.56		
Restaurant equipment (transfer).....		27,679.87		
Post offices.....	22,352.62			22,352.62
School houses.....	1,362,662.75			1,580,264.78
Junior high school, Balboa.....		1,916.20		
High school and junior college, Balboa.....		208,321.33		
High school, Colou Beach.....		7,364.50		
Fire stations.....	104,876.74			104,876.74
Police stations.....	32,719.47			32,719.47
Prisons.....	30,000.00			30,000.00
Courthouses.....	130,892.39			130,892.39
Other buildings and structures.....	53,385.09			247,581.46
Building no. 801, restaurant, Balboa (trans- fer).....		80,771.75		
Hotel Tivoli (part).....		113,424.62		

TABLE No. 3.—*Administrative and civil property, fiscal year 1934—Continued*

	Balance July 1, 1933	Additions	With- drawals	Balance June 30, 1934
Permanent town sites.....	\$1,339,122.76			\$1,421,711.73
Site for new sawmill, Curundu (transfer).....		\$5,400.00		
Survey and grading, Gatun (part).....		77,188.97		
Roads, streets and sidewalks.....	2,839,269.09			2,839,269.09
Storm sewers.....	553,815.74			556,604.79
Miscellaneous.....		2,789.05		
Street-lighting system.....	144,153.43	1,392.22		145,545.65
Total, administrative and civil property.....	12,017,208.41	806,004.59	\$87,903.26	12,735,309.74

TABLE No. 4.—*Business fixed property and equipment, fiscal year 1934*

	Balance July 1, 1933	Additions	Withdrawals	Balance June 30, 1934
BUSINESS FIXED PROPERTY				
Hydroelectric plant, Gatun.....	\$1,662,456.79			\$1,755,561.45
Supervisory control (transfer).....		\$10,476.89		
Outdoor station and other additions.....		82,627.77		
Miraflores power plant.....	1,524,416.92			1,524,416.92
Substations.....	1,977,992.17			1,344,644.35
Supervisory control (transferred).....		\$10,476.89		
Old substation, Gatun (transferred).....		622,870.93		
Transmission system.....	1,355,733.38			1,318,303.21
Changes in transmission, Gatun.....		82,331.79		
Underground cables, Mount Hope.....		17,968.04		
Changes in Gatun cables (transferred).....		137,725.00		
Distribution system.....	1,201,834.29			1,354,330.62
Changes in Gatun cables (transfer).....		137,725.00		
Extensions to system.....		14,771.33		
Total, electric light and power system.....	7,722,433.55	345,900.82	771,072.82	7,297,261.55
Electric work.....	200,694.49			202,842.24
Work shop, Gatun (transfer).....		2,147.75		
Zone water system.....	855,203.91			862,160.01
Water line extension.....		6,956.10		
Zone-Panama water system.....	1,842,509.46			1,842,509.46
Zone-Colon water system.....	819,487.36			819,487.36
Total, water system.....	3,517,200.73	6,956.10		3,524,156.83
Balboa shops.....	2,331,377.80			2,395,623.67
Building no. 40, restaurant, Balboa (transfer).....		64,245.87		
Cristobal shops.....	490,791.58	291,109.72		781,901.30
Total, mechanical division.....	2,822,169.38	355,355.59		3,177,524.97
Balboa fuel-oil plant.....	735,011.82			763,767.51
Improvements, Balboa.....		28,755.69		
Cristobal fuel oil plant.....	1,068,298.58			1,071,882.91
Improvements, Mount Hope.....		3,584.33		
Total, fuel-oil plants.....	1,803,310.40	32,340.02		1,835,650.42
General storehouses.....	1,072,621.43			1,072,621.43
Motor transportation.....	35,888.18			35,888.18
Motor car repair shop.....	20,999.77			19,439.77
Building no. 549, demolished.....			1,560.00	
Building repairs and construction.....	58,661.61			55,463.05
Equipment shed, Balboa, additions.....		3,667.91		
Building no. 1728, Cristobal, changes.....		4,323.01		
Site improvements (transferred).....			11,189.48	
Panama Canal press.....	161,000.00			161,000.00
Gold quarters.....	5,940,771.79			6,157,446.95
New quarters, Cristobal district.....		103,909.12		
New quarters, Gatun district.....		82,819.88		
New quarters, Ancon-Balboa district.....		98,635.45		
Miscellaneous additions.....		5,110.71		
Demolished.....			73,860.00	

TABLE No. 4.—*Business fixed property and equipment, fiscal year 1934—Con.*

	Balance July 1, 1933	Additions	Withdrawals	Balance June 30, 1934
BUSINESS FIXED PROPERTY—continued				
Silver quarters.....	\$688,696.49			\$686,496.49
Demolished.....			\$2,200.00	
Rented buildings.....	715,171.19			324,590.08
Garage stalls, demolished.....			5,994.60	
Restaurant, Balboa (transferred).....			80,771.75	
Restaurant, Balboa shops (transferred).....			64,245.87	
Restaurant, Ancon (transferred).....			79,887.38	
Silver mess, La Boca (transferred).....			12,193.63	
Restaurant, Pedro Miguel (transferred).....			38,334.51	
Restaurant, Cristobal (transferred).....			86,517.21	
Silver mess, Camp Bierd.....			5,000.00	
Lodge hall, no. 146, Pedro Miguel, sold.....			17,636.16	
District quartermasters' supplies.....				11,157.70
New gasoline station, Cristobal (part).....		\$11,157.70		
Hotel Tivoli.....	153,054.40			153,054.40
Buildings (transferred).....				
Total, business fixed property.....	24,912,673.41	1,052,324.06	1,403,457.81	24,561,539.66
BUSINESS EQUIPMENT				
Electric light and power system:				
Machinery and tools.....	11,652.02			
Transferred.....			11,652.02	
Electric ranges.....	181,472.24	7,928.23		189,400.47
Electric heaters.....	15,345.31	1,454.47		16,799.78
Electric work:				
Machinery and tools.....	23,191.12			34,843.14
Transfer.....		11,652.02		
Automobiles.....	6,514.59			6,514.59
Ditcher.....	1,675.00			1,675.00
Telephone, telegraph, and signal work: Machinery and tools.....	7,226.40			7,226.40
Water system: Machinery and tools.....	22,325.18			22,325.18
Municipal engineering work:				
Machinery and tools.....	153,419.32	2,905.87		156,325.19
Road rollers.....	30,082.27		2,750.00	27,332.27
Shops and drydocks: Machinery and tools.....	1,176,961.24			1,176,961.24
Fuel oil plants: Machinery and tools.....	5,678.93			5,678.93
General stores: Equipment.....		940.00		940.00
Motor transportation:				
Machinery and tools.....	19,408.27			10,408.27
Automobiles.....	471,837.24	4,444.46	30,087.57	416,194.13
Mules.....	2,801.21			2,801.21
Motor-car repair shop: Machinery and tools.....	21,818.83			21,818.83
Building repairs and construction: Machinery and tools.....	57,666.34			57,666.34
Panama Canal Press: Machinery and tools.....	17,939.68			17,939.68
Rented buildings, restaurants:				
Equipment.....	27,679.87		27,679.87	
Transferred.....				
District quartermasters' supplies: Equipment.....	6,469.25	1,424.00		7,893.25
Hotel Tivoli:				
Equipment.....	72,657.50		72,657.50	
Transferred.....				
Farm Bureau:				
Equipment.....	1,145.50			1,145.50
Mules.....	1,086.76			1,086.76
Launch <i>La Garza</i>	2,117.50			2,117.50
Marine salvage section:				
Machinery and tools.....	17,927.77			
Barges.....	5,150.00		23,077.77	
Transferred.....				
Total, business equipment.....	2,352,249.34	30,749.05	167,904.73	2,215,093.66
Total, business fixed property and equipment.....	27,264,922.75	1,083,073.11	1,571,362.54	26,776,633.32

TABLE NO. 5.—*Public works in cities of Panama and Colon, fiscal year 1934*

	Panama	Colon	Total
Status of capital cost to June 30, 1934:			
Construction cost:			
Waterworks and sewers.....	\$876,353.22	\$623,883.68	\$1,500,236.90
Pavements.....	592,913.23	625,619.03	1,218,532.26
Total construction cost	1,469,266.45	1,249,502.71	2,718,769.16
Amortization:			
Waterworks and sewers.....	443,499.33	315,556.69	759,056.02
Pavements.....	307,971.30	333,512.72	641,484.02
Total amortization.....	751,470.63	649,069.41	1,400,540.04
Capital cost reimbursable:			
Waterworks and sewers.....	432,853.89	308,326.99	741,180.88
Pavements.....	281,941.93	292,106.31	577,048.24
Capital value, June, 30, 1934.....	717,795.82	600,433.30	1,318,229.12
Operating detail, fiscal year, 1934:			
Operation, maintenance and repairs:			
Waterworks and sewers.....	78,598.50	37,506.99	116,105.49
Pavements.....	6,641.12	24,612.21	31,253.33
Proportion, Zone system.....	94,884.57	30,629.99	125,514.56
Street cleaning and garbage collection.....	76,292.69	38,427.21	114,719.90
Total.....	256,416.88	131,176.40	387,593.28
Interest at 2 percent per annum:			
Waterworks and sewers.....	8,794.72	6,264.58	15,059.30
Pavements.....	5,789.46	5,935.02	11,724.48
Proportion, Zone system.....	13,841.78	7,054.31	20,896.09
Total.....	28,425.96	19,253.91	47,679.87
Amortization:			
Water works and sewers.....	18,515.23	13,188.61	31,703.84
Pavements.....	12,188.33	12,494.78	24,683.11
Total.....	30,703.56	25,683.39	56,386.95
Total charged to water rentals.....	315,546.40	176,113.70	491,660.10
Water rental collections in the Republic of Panama.....	315,546.40	176,113.70	491,660.10

The Panama Canal supplies water to the cities of Panama and Colon from the Canal Zone water system, and maintains the sewers and streets in the two cities under a contract entered into between the Panama Canal and the Republic of Panama in 1907. The Panama Canal collects the water rentals from the residents of these two cities and uses the funds to cover the cost of the water and maintenance of sewers and streets, interest on the unamortized investment at 2 percent per annum and amortization based on 50 years from 1907. Interest on the investment amounting to \$1,430,800.83, and \$1,400,540.04 repaid on the capital cost have been covered into the United States Treasury as miscellaneous receipts, United States revenues.

TABLE No. 6.—*Revenue due United States Treasury*

	Fiscal year 1933	Fiscal year 1934
Cash	\$250,752.79	\$160,315.36
Outstanding audited bills	100.00	100.00
Total	250,852.79	160,415.36

Collections for account of miscellaneous receipts form no part of the working capital of the Panama Canal, since these funds must by law be immediately covered into the United States Treasury and relinquished from control of the Panama Canal. These collections consist mainly of tolls, licenses, court fees and fines, and amortization of public works in Panama and Colon.

Owing to the above restrictions these items are segregated from cash and accounts pertaining to appropriated funds available for expenditure by Canal authorities.

TABLE No. 7.—*Fiscal officers' security deposit accounts, fiscal year 1934*

	Disbursing clerk, Washington, D. C.	Paymaster, Isthmus	Collector, Isthmus	Total
Receipts:				
Cash on hand July 1, 1933		\$33,563.08	\$469,113.23	\$502,676.31
Deposits	\$90,527.28	4,155,248.49	28,538,444.59	32,734,220.36
Total cash debits	90,527.28	4,188,811.57	29,007,557.82	33,286,896.67
Disbursements:				
Panama Canal bills	75,668.94		26,292,257.43	26,367,926.37
Individuals and companies			2,224,543.65	2,224,543.65
Refunds	7,331.06		22,815.90	30,146.96
Civil Service retirement fund	7,509.98	378,634.41		386,144.39
Panama Railroad commissary and miscellaneous services	17.30	3,810,177.16		3,810,194.46
Cash on hand June 30, 1934			467,940.84	467,940.84
Total cash credits	90,527.28	4,188,811.57	29,007,557.82	33,286,896.67

Transactions by the disbursing clerk, Washington, D. C., consist principally of collections from employees for payment into the Civil Service retirement fund. There are also occasional deposits by individuals and companies guaranteeing the payment of Panama Canal and Panama Railroad Co. bills.

The paymaster's account consists entirely of collections from Panama Canal and Panama Railroad Co. employees for commissary coupon books, miscellaneous sales, and service rendered by the Panama Railroad Co. and the Panama Canal.

In the collector's account are deposited funds by banks, individuals, and companies to guarantee payment of bills rendered by the Panama Canal and the Panama Railroad Co., also deposits to guarantee fulfillment of contracts.

The disbursement shown under "Panama Canal bills" represents the revenue earned by the Panama Canal on bills charged against deposits, principally for tolls and other shipping activities. Payments to individuals and companies represent amounts paid the Panama Railroad Co. covering bills charged against depositors, and "refunds" covers amount refunded to various depositors of the difference between the amount deposited and the charges made against such deposits.

TABLE NO. 8.—*Receipts and disbursements by collector of Canal Zone funds*

FISCAL YEAR 1933		FISCAL YEAR 1934	
Balance on hand July 1, 1932.....	\$1,784,939.06	Balance on hand July 1, 1933.....	\$2,239,639.54
Receipts:		Receipts:	
Clubhouse funds	\$445,344.40	Clubhouse funds...	\$399,320.34
Trust funds.....	21,802.85	Trust funds.....	22,589.63
Money-order funds	2,595,815.40	Money-order funds	2,294,376.57
Interest.....	49,851.79	Interest.....	70,867.05
	<u>3,112,814.44</u>		<u>2,787,153.59</u>
Total.....	4,897,753.50	Total.....	5,026,793.13
Disbursements:		Disbursements:	
Clubhouse funds	\$470,169.45	Clubhouse funds...	\$432,385.92
Trust funds.....	19,060.10	Trust funds.....	22,712.81
Money-order funds	2,143,562.84	Money-order funds	2,426,396.50
Interest.....	25,321.57	Interest.....	37,238.21
	<u>2,658,113.96</u>		<u>2,918,733.44</u>
Balance on hand June 30, 1933.....	2,239,639.54	Balance on hand June 30, 1934.....	2,108,059.69
Clubhouse funds.....	\$77,836.21	Clubhouse funds...	\$44,770.63
Trust funds.....	7,826.55	Trust funds.....	7,703.37
Money-order funds	2,103,883.14	Money-order funds	1,971,863.21
Interest.....	49,912.64	Interest.....	83,541.48
Postal savings.....	181.00	Postal savings.....	181.00

TABLE No. 9.—*Cash receipts and disbursements for account of the United States, fiscal year ended June 30, 1934.*

CASH RECEIPTS

	Disbursing clerk, Wash- ington, D. C.	Paymaster, Canal Zone	Collector, Canal Zone	Total, fiscal officers	United States treasurer	Total
On hand July 1, 1933, by appropriations and funds:						
Maintenance and operation, Panama Canal	\$70,176.15	\$1,249,118.14	\$117,643.85	\$1,436,928.14	\$7,222,103.03	\$8,659,041.57
Sanitation, Canal Zone, Panama Canal	6,677.46	93,122.57	5,930.93	105,730.96	56,378.61	162,109.57
Civil government, Panama Canal and Canal Zone	973.24	69,736.70	1,920.96	72,630.90	177,599.58	250,230.48
Miscellaneous receipts, United States revenues		01	250,732.78	250,732.79		250,732.79
Special deposits		33,563.08	469,113.23	502,676.31		502,676.31
Total	77,826.85	1,445,540.50	845,361.75	2,368,729.10	7,456,081.22	9,824,810.32
Appropriations for fiscal year 1934:						
Maintenance and operation, Panama Canal					11,172,700.00	11,172,700.00
Sanitation, Canal Zone, Panama Canal					698,426.00	698,426.00
Civil government, Panama Canal and Canal Zone					1,235,278.00	1,235,278.00
National industry recovery, War, Panama Canal, 1933-35					1,000,000.00	1,000,000.00
Repayment of unemployed aliens, Panama Canal					150,000.00	150,000.00
Total					14,256,494.00	14,256,494.00
Transfers between fiscal officers:						
Maintenance and operation, Panama Canal	4,300,000.00	10,650,403.04	14,950,403.04	78,033.41	15,028,436.45	
Sanitation, Canal Zone, Panama Canal	85,000.00	1,127,834.34	1,212,834.34	15,424.65	1,228,258.99	
Civil government, Panama Canal and Canal Zone	40,000.00	906,637.59	948,637.59	1,735.32	948,372.91	
Postal funds, Canal Zone (special fund)		165,000.00	165,000.00	165,000.00	201,884.01	366,884.01
National industry recovery, War, Panama Canal	100,000.00	800,000.00	900,000.00			900,000.00
Total	4,525,000.00	13,649,874.97	18,174,874.97	297,077.39	18,471,952.36	
Collections:						
Maintenance and operation, Panama Canal	145,280.32	118,482.72	7,450,505.89	7,714,298.93	246,03	7,714,514.96
Sanitation, Canal Zone, Panama Canal	13,164.68		585,162.27	598,326.95	40,029.51	638,356.46
Civil government, Panama Canal and Canal Zone	1,160.74	21,769.41	96,043.02	118,973.17		118,973.17
Postal funds, Canal Zone (special fund)	5,750.00		236,101.92	241,851.92		241,851.92
Miscellaneous receipts, United States revenue	329.55		33	24,240,407.24		24,240,437.12
Special deposits	90,527.28	4,155,248.49	28,538,444.59	32,784,220.36		32,784,220.36
Total	236,212.57	4,295,500.95	61,146,304.93	65,698,078.45	40,275.54	65,738,353.99
Total cash debits	4,859,039.42	19,390,916.42	61,991,726.68	86,241,682.52	22,049,838.15	108,291,520.67
Total cash debits						

CASH DISBURSEMENTS

Covered into the United States Treasury, business profits fiscal year 1933, maintenance and operation, Panama Canal						
Tolls and other miscellaneous receipts: miscellaneous receipts, United States revenues	\$329,55	\$0.34	\$24,330,544.66	\$24,330,574.55	\$011,423.74	\$611,423.74
Economy Act imponddings:					24,330,574.55	
Maintenance and operation, Panama Canal					1,416,510.24	1,416,510.24
Sanitation, Canal Zone, Panama Canal					174,635.92	174,635.92
Civil government, Panama Canal and Canal Zone					132,214.31	132,214.31
Total economy act imponddings.					1,723,360.47	1,723,360.47
Transfer of postal appropriation, civil government, Panama Canal and Canal Zone.					180,113.00	180,113.00
Transfer of balance of court salaries to Department of Justice, civil government Panama Canal and Canal Zone.					27,629.97	27,629.97
Total	329,55	.34	24,330,544.66	24,330,574.55	2,542,527.18	26,873,401.73
Transfers between fiscal officers:						
Maintenance and operation, Panama Canal						
Sanitation, Canal Zone, Panama Canal	77,502.01		7,450,934.44	7,528,436.45	7,500,000.00	15,028,436.45
Civil government, Panama Canal and Canal Zone	15,424.65		582,834.34	598,268.99	630,000.00	225,265.99
Postal funds, Canal Zone (special fund)	1,735.32		96,637.59	98,372.91	850,000.00	948,372.91
National industry recovery, war, Panama Canal, 1933-35	5,175.00		196,709.01	201,884.01	165,000.00	366,884.01
Total	99,836.98		8,327,115.38	8,426,952.36	10,045,000.00	18,471,952.36
Disbursements:						
Maintenance and operation, Panama Canal						
Sanitation, Canal Zone, Panama Canal	3,980,738.86	10,314,573.19		14,495,322.05	1,121.23	14,496,443.26
Civil government, Panama Canal and Canal Zone	74,643.38	1,156,206.40		1,230,580.21	40.00	1,230,580.21
Postal funds, Panama Canal (special fund)	38,067.96	944,023.84		982,091.80		982,091.80
National industry recovery, war, Panama Canal, 1933-35						
Special deposits	62,726.37	745,793.75		146,283.29		146,283.29
	90,527.28	4,188,811.57		808,522.12		808,522.12
Total	4,246,714.28	17,695,694.04	28,539,616.98	50,482,025.30	1,161.23	50,483,186.53
On hand June 30, 1934:						
Maintenance and operation, Panama Canal						
Sanitation, Canal Zone, Panama Canal	457,205.60	1,503,430.71	117,215.30	2,077,851.61	8,944,027.26	11,021,878.87
Civil government, Panama Canal and Canal Zone	14,773.68	64,750.51	8,288.86	57,783.06	5,882.86	93,365.90
Postal funds, Panama Canal (special fund)	2,330.70	54,119.86	1,326.39	57,776.96	224,655.62	282,432,57
National industry recovery, war, Panama Canal, 1933-35	575.00	18,716.71	39,392.91	58,084.62	36,884.01	95,568.63
Repatriation of unemployed aliens, Panama Canal	37,273.63	54,204.25		91,477.88	100,000.00	191,477.88
Miscellaneous receipts, United States revenues					150,000.00	150,000.00
Special deposits						
Total	512,158.61	1,685,222.04	160,315.36	160,315.36		160,315.36
Total cash credits	4,850,639.42	19,300,916.42	794,149.66	3,001,830.31	9,461,149.74	12,462,980.05
Total					22,049,838.15	108,291,520.67

1 Includes \$2,000,000 special Panama R, R, Co. dividends.

During the fiscal year the Treasurer of the United States advanced to the fiscal officers of the Panama Canal the sum of \$10,045,000 and disbursed directly from the Treasury \$1,161.23, a total of \$10,046,-161.23. Against this amount the fiscal officers of the Panama Canal remitted to the Treasury the sum of \$297,077.39 and direct collections by the Treasurer amounted to \$40,275.54, a total of \$337,352.93, resulting in a net withdrawal of appropriated funds from the United States Treasury amounting to \$9,708,808.30 as compared with \$11,026,293.57 withdrawn the previous fiscal year.

Additional detail of collections by the collector on the Isthmus are shown in table no. 30, and of special deposit funds in table no. 7.

TABLE NO. 10.—*Accounts receivable
REGISTERED DURING THE YEAR*

	Fiscal year 1933	Fiscal year 1934
Repaid to appropriations:		
Panama Railroad Co.....	\$1,890,573.95	\$1,685,081.92
Departments of the United States Government.....	1,485,679.95	1,463,208.82
Individuals and companies.....	3,096,721.58	3,283,409.10
National industry recovery.....		579,421.07
Total.....	6,472,975.48	7,011,120.91
Miscellaneous receipts:		
Tolls.....	19,621,210.76	24,065,705.02
Other miscellaneous receipts.....	1,232.00	8.00
Total.....	19,622,442.76	24,065,713.02
Total accounts receivable registered.....	26,095,418.24	31,076,833.93
Number of bills registered.....	38,244.00	38,223.00
Outstanding accounts receivable:		
Audited bills.....	559,543.20	656,670.11
Hospital certificates.....	24,775.69	22,621.98
Injury compensation.....	3,218.43	3,716.68
Unredeemed commissary coupons.....	31.00	143.54
Total.....	587,568.32	683,152.31

The outstanding balance at the end of the fiscal year includes all accounts due the Panama Canal except items pertaining to miscellaneous receipts (table no. 6) and a few items of utility service, principally for employees, which are not credited to earnings until collected, usually by pay-roll deduction.

TABLE No. 11.—*Material and supplies*

	Fiscal year 1933	Fiscal year 1934
Stock on hand, first of year:		
Balboa store.....	\$2,602,873.37	\$2,205,356.31
Medical store.....	62,729.98	63,877.08
Administration building store.....	32,401.85	21,271.72
Paraiso store.....	600,934.45	566,721.60
Cristobal store.....	492,002.10	390,656.72
Locks store.....	622,915.85	583,758.91
Fuel oil plants.....	41,906.08	84,973.44
Panama Canal press.....	79,731.07	59,323.62
Sand and gravel pile.....	114,801.50	64,111.30
Division stores.....	242,979.01	340,342.76
Total stock-card value.....	4,893,275.26	4,380,393.46
Reserve for inventory adjustments.....	320,173.83	419,609.98
Book value of stock on hand.....	4,573,101.43	3,960,783.48
Receipts of material:		
Purchases for stock.....	3,206,164.56	3,279,422.63
Purchases for divisions.....	706,057.19	1,073,096.02
Local production, service charges, etc.....	475,051.80	528,066.22
Book value of receipts.....	4,387,273.55	4,880,584.87
Total charges to stock.....	8,960,374.98	8,841,368.35
Issues and sales of material:		
Issues to business divisions.....	2,674,791.23	3,214,847.81
Issues to Canal divisions.....	1,391,619.37	952,846.46
Variation in division stores.....	¹ 97,363.75	147,813.17
Total issues.....	3,969,046.85	4,315,507.44
Sales.....	1,030,544.65	1,037,800.22
Total issues and sales.....	4,999,591.50	5,353,307.66
Stock on hand, end of year:		
Balboa store.....	2,205,356.31	2,027,376.53
Medical store.....	63,877.08	72,537.33
Administration building store.....	21,271.72	20,571.92
Paraiso store.....	566,721.60	375,608.90
Cristobal store.....	390,656.72	391,636.67
Locks store.....	583,758.91	584,799.35
Fuel oil plants.....	84,973.44	28,967.86
Panama Canal press.....	59,323.62	61,317.75
Sand and gravel pile.....	64,111.30	74,710.93
Division stores.....	340,342.76	192,529.59
Total stock-card value.....	4,380,393.46	3,830,056.83
Reserve for inventory adjustments.....	419,609.98	341,996.14
Book value of stock on hand.....	3,960,783.48	3,488,060.69

¹ Indicates reduction of issues and sales.

In the foregoing table all values are stated at stock-card prices which cover the cost of material delivered into general storehouses, except for necessary adjustments due to price averaging of various consignments of the same article, inventory discrepancies, exchange of containers, etc.

Issues to Canal divisions are made at cost, but issues to business divisions and sales to commercial interests are surcharged above the stock-card values shown in the foregoing table to produce the total revenue shown under general storehouses on table no. 26 against gross expenses which include storehouse operations as well as the cost of goods sold.

TABLE NO. 12.—*Work in progress*

	Fiscal year 1933	Fiscal year 1934
Electrical division.....	\$230.28	\$1,915.61
Municipal division.....	5,231.18	543.39
Shops and drydocks.....	45,299.27	25,798.64
Building repairs and construction.....		1,335.94
Panama Canal press.....	1,520.27	3,451.98
Total.....	52,281.00	33,045.56

This account covers the amounts expended on uncompleted jobs and will ultimately be cleared to operating expenses of the divisions indicated, with corresponding credits to their revenues after application of authorized surcharge.

TABLE NO. 13.—*Deferred charges*

	Fiscal year 1933	Fiscal year 1934
Clubs and playgrounds.....	\$2.00	
Health department.....	7,356.49	\$7,202.07
District quartermaster, Cristobal.....	1,152.00	
Port captain, Balboa.....	1,049.65	2,057.09
Port captain, Cristobal.....	308.22	
Lighthouse subdivision.....	41.75	
Dredging division.....	59,319.75	6,437.40
Electrical division.....	4,174.06	247.79
Municipal division.....		1,204.52
Shops and drydocks.....	62,007.92	19,482.49
General storehouses.....		4,855.67
Motor transportation.....	60.68	
Building repairs and construction.....	10,591.03	22,556.33
Gold quarters.....		40.10
Rented buildings.....	15.24	
District quartermasters' supplies.....	835.29	1,577.46
Madden Dam division.....	44.19	
Public works, Panama.....	12,696.89	173.54
Public works, Colon.....	17,216.86	19,718.04
Total.....	176,872.02	85,552.50

This account covers expenses incurred for account of divisions indicated, but which are not chargeable to operating accounts of the year. These amounts are cleared as soon as values are consumed.

TABLE NO. 14.—*Capital investment*

Appropriations for Canal construction to June 30, 1921 (details in Annual Report for 1924, table no. 3).....	\$386,910,301.00
Deduct value of capital stock of the Panama Railroad Co.....	7,000,000.00
Net construction appropriations.....	379,910,301.00
Annual payments to the Republic of Panama, 1913 to 1921 (State Department).....	2,250,000.00
Maintenance funds diverted to construction, 1922 to June 30, 1934.....	17,932,045.66
Total cash investment.....	400,092,346.66
Interest on construction funds (compounded annually) 1904 to 1921.....	143,652,360.43
Total capital investment.....	543,744,707.09

The capital investment account covers the following assets as of June 30, 1934, shown in comparison with assets on June 30, 1933:

	June 30, 1933	June 30, 1934
Canal fixed property and equipment (table no. 2).....	\$494,168,312.00	\$498,794,534.91
Administrative and civil property (table no. 3).....	12,017,208.41	12,735,309.74
Business fixed property and equipment (table no. 4).....	27,264,922.75	26,776,633.32
Public works, Republic of Panama (table no. 5).....	1,374,616.07	1,318,229.12
Proportion of working capital (table no. 23).....	4,375,000.00	4,120,000.00
Total capital assets.....	539,200,059.23	543,744,707.09

The construction period of the Panama Canal is considered as extending to the close of the fiscal year 1921, and computed interest during this period has been charged to capital account.

The capital investment of \$543,744,707.09 at the close of 1934 is considered as representing a perpetual bond issue with interest at 3 percent, except that sales and final withdrawals of capital assets will be deducted, and current additions to capital assets will be added to the capital investment, but no reduction in bonded liability will be made for accrued depreciation of capital assets while in service.

Interest on the capital investment from 1922 to date is considered as a charge to operating expenses, and while this charge does not appear on the balance sheet a statement of such interest compared with net revenues, by years, is shown on table no. 21. Interest for the fiscal year is based upon the capital investment of \$539,200,059.23, as of June 30, 1933, and amounts to \$16,176,001.78. Interest for the ensuing fiscal year will be based upon the capital investment of \$543,744,707.09, as of June 30, 1934.

TABLE No. 15.—*Outstanding accounts payable*

	Fiscal year 1933	Fiscal year 1934
United States invoices.....	\$31,248.09	\$81,319.60
Isthmus vouchers.....	296,047.07	197,591.33
Current pay rolls.....	923,527.47	867,889.06
Unpaid salaries and wages.....	27,967.49	27,228.87
Drums, carboys and reels.....	3,709.12	5,358.59
Local purchases.....	13,575.56	1223.27
Total.....	1,216,427.50	1,179,164.18

¹ Denotes debit.

The above table covers all current obligations of the Panama Canal, except deposits to guarantee payment of bills which are covered by table no. 7, security deposits, and table no. 8, trust funds.

TABLE NO. 16.—*Reserve for replacements (funded)*

	Fiscal year 1933	Fiscal year 1934
Canal equipment:		
Tugs	\$668,090.38	\$745,869.38
Supply boats	39,531.60	41,931.60
Launches	129,233.78	150,959.78
Dredges	276,295.79	375,115.79
Lighters and scows	399,013.86	275,109.16
Craneboats	17,584.71	4,000.00
Barges	103,639.83	99,809.39
Ferry boats	14,709.49	26,709.49
Excavators	15,633.00	17,370.00
Cranes	4,363.45	5,432.05
Marine salvage equipment	15,728.79	16,121.86
Reserve equipment	81.82	106.82
Total Canal equipment	1,683,906.50	1,758,535.32
Business fixed property:		
Electric light and power system	400,564.90	348,284.22
Electric work	3,831.74	7,844.90
Water system	290,596.30	334,159.17
Shops and drydocks	264,853.42	47,267.08
Fuel oil plants	436,177.11	483,742.04
General storehouses	24,000.00	47,396.16
Motor transportation	7,009.62	9,012.83
Motor car repair shop	12,863.95	14,130.41
Building repairs and construction	8,487.88	1,774.14
Panama Canal press	10,760.00	13,988.00
Gold quarters	195,001.85	229,667.71
Rented buildings	81,184.97	94,310.16
District quartermasters' supplies		1,757.70
Hotel Tivoli	67,629.62	68,885.55
Colliers	72,145.46	72,145.46
Coal barges	50,000.00	50,000.00
Total business fixed property	1,925,106.82	1,820,850.13
Business equipment:		
Electric light and power system	12,017.77	9,041.50
Electric work	27,571.59	54,784.95
Telephone, telegraph, and signal work	13,148.51	13,563.30
Water system	20,959.44	25,882.97
Municipal work	103,594.48	105,082.24
Shops and drydocks	48,179.73	90,615.81
Fuel oil plants	6,184.71	6,664.20
General storehouses	15,482.71	28,800.72
Motor transportation	98,762.74	129,020.66
Motor car repair shop	14,123.18	435.59
Building repairs and construction	40,004.37	48,056.97
Panama Canal press	35,384.07	36,456.13
Rented buildings	1,696.94	
District quartermasters' supplies	5,631.76	5,927.26
Hotel Tivoli	44,539.07	44,539.07
Farm bureau	2,758.80	2,271.31
Total business equipment	471,793.51	601,142.68
Total business fixed property and equipment	2,396,900.33	2,421,992.81
Total reserve for replacements	4,080,806.83	4,180,528.13

¹ Denotes debit.

The foregoing table covers the amount of funds available for the replacement of Canal equipment and business fixed property and equipment. During the year there was added to the replacement reserve by charges against operating expenses, and from proceeds of sales, approximately \$1,058,300.

There were used from replacement reserves the following amounts in round figures: Craneboat *Atlas* (part) \$197,000; grader barge improvements, \$23,000; electric power system improvements and replacements, \$165,000; water system replacements, \$10,000; Cristobal

shop improvements, \$291,000; additions and replacements to fuel-oil plants, \$35,000; gold quarters construction, \$125,000; miscellaneous improvements to buildings, \$45,000; and miscellaneous equipment renewals, \$42,600; also a transfer of \$25,000 to other reserves; making total charges of \$958,600.

Against the combined reserves available for repairs and replacements at the close of June 1934, as shown in the foregoing table, and in table no. 17, the following amounts have already been allotted: Electric power system improvements, \$130,000; water system improvements, \$25,000; Cristobal shop improvements, \$40,000; fuel-oil plant improvements, \$50,000; gold quarters construction, \$210,000; and miscellaneous improvements to structures, \$22,500; replacement of tug, \$225,000; launches, \$60,000; barges, \$150,000; automobiles, \$30,000; and miscellaneous equipment, \$53,500; a total of \$996,000.

TABLE No. 17.—*Reserve for repairs (funded)*

	Fiscal year 1933	Fiscal year 1934
Canal equipment:		
Tugs.....	\$64,515.33	\$148,903.79
Supply boats.....	18,254.15	17,298.97
Launches.....	78,753.69	83,244.95
Dredges.....	1,761.80	100,934.56
Lighters and scows.....	139,102.88	184,708.40
Craneboats.....	17,926.92	1,500.00
Barges.....	19,487.37	46,065.87
Ferry boats.....	4,985.31	5,856.73
Total equipment	338,279.15	563,915.33
Business fixed property:		
Electric light and power system.....	57,625.03	70,705.03
Electric work.....	509.57	881.09
Shops and drydocks.....	48,085.70	30,353.45
Wharves and piers.....	20,349.25	35,349.25
Fuel-oil plants.....	110,395.83	101,397.96
General storehouses.....	21,548.52	36,281.19
Panama Canal press.....	2,964.40	3,759.01
Total business fixed property	261,478.30	278,726.98
Business equipment:		
Electric work.....	264.89	180.50
Municipal work.....	31,740.23	31,709.72
Shops and drydocks.....	85,991.78	75,787.20
Motor transportation.....	10,000.00	4,560.96
Building repairs and construction.....	10,787.96	10,785.33
Panama Canal press.....	1,512.21	1,200.07
Farm bureau.....	526.09	1,000.40
Marine salvage section.....	45,324.26	-----
Total business equipment	186,147.42	125,224.18
Total business fixed property and equipment	447,625.72	403,951.16
Total reserve for repairs	785,904.87	967,866.49

¹ Denotes debit.

On July 1, 1933, the reserve for extraordinary repairs amounted to \$785,904.87, to which was added during the year \$647,605.68 by charges to operating expenses. Expenditures of \$465,644.06 were charged against this reserve, leaving a balance on June 30, 1934, of \$967,866.49 available for general overhaul of floating equipment and

extraordinary repairs to business property. (For obligations against the combined balance of replacement and repair reserves, see remarks under table no. 16.)

TABLE NO. 18.—*Reserve for vacation pay (funded)*

	Fiscal year 1933	Fiscal year 1934
Electrical division.....	\$130,627.85	\$117,175.04
Municipal division.....	59,072.35	51,559.27
Shops and drydocks.....	203,434.96	174,637.81
Motor transportation.....		10,761.49
Motor-car repair shops.....		7,502.20
Building repairs and construction.....	34,211.79	27,474.16
Madden Dam division.....	27,807.92	38,420.59
Fortifications division.....	18,855.43	13,369.90
Total.....	474,010.30	440,900.46

The foregoing table represents the amount of cash held in reserve for vacation pay due employees of the principal business divisions. This fund is created by adding a percentage to the direct gold labor charges for work performed by the division listed above to the credit of this account. The account is debited with the amount paid to employees when leave is actually taken or when leaving the service.

Reserves for vacation pay of employees in motor transportation division and motor-car repair shops were instituted in the fiscal year 1934 by transfer from excess reserve for replacement of automobiles, and will be handled in the manner described above.

TABLE NO. 19.—*Deferred credits*

	Fiscal year 1933	Fiscal year 1934
Executive offices.....		\$1,306.25
Accounting office.....	\$650.00	2,800.00
Civil government.....	1,602.63	5,361.61
Division of posts.....		56,050.00
Health department.....	21,813.88	9,783.47
Office engineer.....		2,375.00
Surveys.....		718.43
District quartermaster, Balboa.....		3.00
Port captain, Balboa.....		3,802.57
Dredging division.....		2,600.00
General suspense.....	1,695.96	1,630.57
Electrical division.....		1,3,325.81
Municipal division.....	44,292.25	34,952.17
Shops and drydocks.....	48,642.94	28,505.12
General storehouses.....	6,574.81	1,500.09
Motor transportation.....		2,750.00
Motor-car repair shop.....		43.11
Building repairs and construction.....	12,268.01	10,455.09
Farm bureau.....	8,348.27	7,780.82
Nautical charts and publications.....	1,381.42	1,109.11
Madden Dam division.....	213,303.19	135,633.87
Public works, Panama.....		128.50
Contingencies, maintenance and operation.....	45,510.04	45,492.83
Contingencies, sanitation.....	640.19	647.82
Contingencies, civil government.....	148.07	148.07
Total.....	406,871.66	352,094.69

¹ Denotes debit.

This account covers expenses accrued or estimated which have been charged to operating accounts, but for which it was impracticable to institute corresponding payments at the close of the accounting period. These amounts are cleared as soon as corresponding charges are passed for payment or contingent expenses arise.

TABLE No. 20.—*Consolidated statement of income, expenses, and net revenues*

	Fiscal year 1933	Fiscal year 1934
Canal operations:		
Canal revenues—		
Tolls.....	\$19,621,158.61	\$24,065,065.16
Postal receipts.....	238,610.78	
Postal surplus.....		25,361.53
Other miscellaneous receipts.....	71,403.38	71,305.14
Total Canal revenues (table no. 24).....	19,931,172.77	24,161,731.83
Canal earnings (table no. 25).....	2,702,673.34	2,950,695.35
Total revenues.....	22,633,846.11	27,112,427.18
Canal expenses—		
Executive department.....	395,318.12	340,961.00
Clubs and playgrounds.....	217,176.02	208,311.88
Accounting department.....	490,224.38	445,367.47
Washington office.....	256,596.42	223,170.60
Civil government.....	1,235,360.82	1,130,023.45
Health department.....	1,491,665.10	1,263,143.42
Office engineer.....	110,017.90	97,323.90
Section of surveys.....	97,071.05	95,852.36
Public buildings and grounds.....	341,547.32	286,939.68
Marine division.....	1,243,245.24	1,335,867.24
Locks operation and maintenance.....	1,081,957.26	1,092,280.60
Locks overhaul.....	822,365.39	
Gatun Dam and Spillway.....	59,312.72	50,845.27
Dredging division.....	2,015,666.86	1,803,923.68
Municipal expenses.....	242,157.77	262,227.90
Proportion of general stores expense.....	279,916.00	182,000.00
Railroad tracks, maintenance.....	19,000.15	15,679.85
Recruiting and repatriating employees.....	10,953.12	25,928.23
Transportation of employees on Isthmus.....	120,000.00	120,000.00
Maintenance of laborers' quarters.....	67,928.94	
Damage to vessels.....	4,239.50	59,916.81
Canal Zone experimental gardens.....		5,000.00
Miscellaneous general expense.....		690.50
Depreciation on fixed property.....	1,006,625.28	1,006,625.28
Annual payment to the Republic of Panama.....	250,000.00	250,000.00
Total Canal expenses.....	11,858,345.36	10,302,079.12
Net Canal revenues (table no. 25).....	10,775,500.75	16,810,348.06
Fixed capital charge.....	15,224,192.20	15,392,677.01
Surplus or (deficit).....	14,448,691.45	1,417,671.05
Business operations:		
Business revenues.....	16,583,950.43	15,858,897.27
Business expenses.....	15,448,241.81	14,492,142.15
Net business revenues (table no. 26).....	1,135,708.62	1,366,755.12
Fixed capital charge.....	768,988.08	783,324.77
Surplus.....	366,720.54	583,430.35
Combined Canal and business operations:		
Revenues.....	39,217,796.54	42,971,324.45
Expenses.....	27,306,587.17	24,794,221.27
Net revenues.....	11,911,209.37	18,177,103.18
Fixed capital charge at 3 percent.....	15,993,180.28	16,176,001.78
Surplus or (deficit).....	14,081,970.91	2,001,101.40
Capital investment (table no. 14).....	533,106,009.47	539,200,059.23
Combined net revenues.....	11,911,209.37	18,177,103.18
Percent of capital return.....	2.23	3.37

¹ Deficit.

A summary comparison of net revenues and capital interest, by years, from 1922 to date is shown on table no. 21, following, together with a brief description of accounting policy governing charges to operating expenses.

TABLE No. 21.—*Revenues, expenses, and computed surplus*

Fiscal year	Tolls	Civil revenues	Business profits	Total revenues	Net appropriation expenses ¹	Net revenues	Capital interest ³ percent ²	Computed surplus
1914 to 1921.....	\$1,420,566.98	\$1,100,309.54	\$47,086,376.57	\$45,986,067.03	\$1,100,309.54	\$1,100,309.54		
1922.....	11,193,383.47	192,208.85	11,708,451.48	8,169,917.63	3,539,832.86	\$15,759,105.50	3 12,219,271.15	
1923.....	17,507,630.52	184,213.54	182,822,486.56	7,940,777.56	10,891,709.00	15,759,105.50	3 4,867,396.50	
1924.....	24,289,003.16	392,250.73	901,624.12	25,583,478.01	8,623,905.39	16,939,572.62	1,200,467.12	
1925.....	21,374,664.12	207,954.04	765,916.85	22,348,635.01	8,366,693.44	13,981,841.57	1,777,263.98	
1926.....	22,927,456.03	217,680.50	841,310.29	23,986,446.82	8,243,468.47	15,732,978.35	1,53,327.15	
1927.....	24,217,185.32	391,623.50	876,536.80	25,455,345.62	9,247,715.02	16,237,630.60	1,80,655.50	
1928.....	26,943,513.11	232,532.57	736,719.43	27,912,765.11	9,201,200.82	18,711,564.29	406,975.10	
1929.....	27,123,534.33	243,391.39	737,580.26	28,104,775.98	9,887,150.71	18,217,625.27	2,866,110.45	
1930.....	27,077,117.36	349,255.35	760,971.66	28,187,344.37	9,593,920.93	15,875,152.13	2,342,473.14	
1931.....	24,644,550.39	346,030.35	562,764.17	25,553,344.91	10,393,353.53	18,593,423.44	2,092,771.31	
1932.....	20,706,568.49	327,444.23	565,065.44	24,591,108.16	9,839,211.84	15,139,091.38	3,791,060.75	
1933.....	19,621,158.61	310,014.16	1,135,708.62	21,066,881.39	9,155,672.02	11,911,209.37	1,514,378.57	
1934.....	24,065,065.16	96,666.67	1,366,755.12	25,528,486.95	7,351,383.77	18,177,103.18	16,176,001.78	3 4,081,970.91
Total.....	336,256,931.05	4,911,831.93	11,807,463.96	352,976,226.94	161,999,538.16	190,976,688.78	206,319,253.86	3 15,342,565.08

¹ After deduction of Canal earnings repaid to appropriations.² Interest prior to 1922 is included in capital investment account.³ Deficit.

The purpose of this table is to present a statistical summary of net earnings of the Panama Canal on a basis reasonably comparable with corporate practice, but it is obvious that the cost of Canal construction and development could not have been financed from corporate funds on an interest basis as low as 3 percent, although this rate is considered reasonable for Government borrowings over an indefinite period.

Whatever difference exists in interest rates between Government and corporate financing must necessarily be considered as a charge to the value of the Canal as an instrument of national defense, because the use of an interest rate appreciably higher than 3 percent would increase the capital investment to a figure so high that it would preclude reasonable probability that Canal earnings could ever overtake the compounding interest on operating deficits.

The date determined for transferring the interest burden from capital to operating account, fixed at the close of the fiscal year 1921, is necessarily arbitrary, but represents a consensus of competent opinion. Interest chargeable to operations is not included on the balance sheet, and no interest charge against the Canal is actually made by the United States Treasury.

Total revenues on the foregoing statement represent receipts which must be covered into the United States Treasury and relinquished from control of the Panama Canal. Earnings repayable to Canal appropriations, and reexpendable by the Canal, are deducted from gross operating expenditures, in order to present a comparison of funds covered into the Treasury with funds chargeable to operating account, exclusive of capital additions.

Operating expenses include depreciation charges based upon the estimated life of plants and equipment; and also a depreciation charge of approximately \$1,000,000 per year on depreciable items of general property of an undetermined life. While this latter amount is small in comparison with capital values, the greater portion of Canal construction costs cover waterways and harbors which are in the nature of geographical changes and which do not depreciate; in fact, constant dredging operations, the cost of which is charged to current expenses, are gradually deepening, straightening, and widening Canal channels and basins.

The absence of tax charges, ordinarily included in corporate expenses, is compensated for by the inclusion in Canal operating accounts of the direct costs of civil government, health, and welfare activities. Neither capital nor operating expenses of the Panama Canal include the cost of the military and naval establishments on

the Isthmus; however, all important exchanges of services with these interests are covered by cash settlements, or reciprocal allowances.

While exact reconciliations with corporate practice are manifestly impossible, it is believed that the accounting procedure established compensates for major differences, and that the net results shown in the foregoing tabulation afford a reasonably accurate statement of Canal operations on the basis of a public utility.

TABLE No. 22.—*Capital refunds*
MISCELLANEOUS RECEIPTS COVERED INTO THE U. S. TREASURY

Fiscal year	Tolls	Postal receipts	Taxes, fees, fines, etc.	Business profits	Miscellaneous ¹	Total
1922	\$11,205,886.64	\$117,047.24	\$45,201.62	\$621,272.19	\$60,000.00	\$112,049,407.69
1923	17,228,097.42	117,173.59	45,846.19	323,259.16	153,598.37	17,808,274.73
1924	24,486,652.08	119,364.27	57,049.31	1,140,642.50	270,807.97	26,074,516.13
1925	21,309,629.39	136,032.67	36,406.22	901,624.12	55,286.36	22,539,078.76
1926	22,920,422.67	142,854.91	63,433.56	765,916.85	49,177.00	23,941,804.99
1927	24,239,775.87	144,542.94	67,601.53	841,310.29	25,544,704.00	25,473,37
1928	26,955,647.14	147,502.27	73,118.06	870,336.80	81,341.51	28,134,345.75
1929	27,054,536.55	162,590.89	72,651.38	736,719.43	104,948.94	28,131,447.19
1930	27,121,831.94	261,183.41	76,986.81	737,850.26	75,227.77	28,273,080.19
1931	24,670,281.59	257,061.52	80,053.25	760,971.66	64,300.78	25,832,668.80
1932	20,776,860.08	241,447.36	75,319.54	562,764.17	92,520.30	21,785,911.45
1933	19,464,173.04	236,572.53	71,207.83	557,095.44	890,289.84	21,219,338.68
1934	24,135,261.01	20,124.04	71,092.79	611,123.74	2,035,500.15	26,873,401.73
Total	29,659,055.42	2,103,497.64	836,068.09	9,437,386.61	4,184,972.36	308,240,980.12

Includes amortization, public works, Panama and Colon, bank interest, sale of Government property, etc., also Economy Act impoundings amounting to \$1,723,360.47.

TABLE No. 22.—*Capital refunds—Continued*
TOTAL APPROPRIATIONS

Fiscal year	Maintenance and operation	Sanitation	Civil government	Miscellaneous appropriations ¹	Annual payment to Panama	Total
1922.....	\$7,250,000	\$850,000	\$900,000	\$21,500	\$250,000	\$9,271,500.00
1923.....	2,639,434	525,000	930,000	16,800	250,000	4,381,234.00
1924.....	5,079,683	575,000	930,000	17,520	250,000	6,832,203.00
1925.....	5,851,210	586,266	991,670	7,679,146.00	250,000	7,679,146.00
1926.....	7,140,000	633,216	942,150	250,000	8,985,346.00	8,985,346.00
1927.....	5,986,094	670,000	999,980	250,000	7,906,074.00	7,906,074.00
1928.....	5,830,000	670,000	1,100,000	250,000	7,850,000.00	7,850,000.00
1929.....	6,832,000	722,000	1,172,400	250,000	8,973,400.00	8,973,400.00
1930.....	8,000,000	820,000	1,201,000	250,000	10,271,000.00	10,271,000.00
1931.....	10,162,470	753,900	1,295,190	250,000	12,461,560.00	12,461,560.00
1932.....	9,359,808	782,189	1,351,689	250,000	11,713,689.00	11,713,689.00
1933.....	11,891,011	755,050	1,300,000	250,000	14,196,661.00	14,196,661.00
1934.....	11,172,700	688,126	1,235,278	1,150,000	250,000	14,506,404.00
Total.....	97,214,410	9,061,647	14,349,357	1,205,820	3,250,000	125,081,234.00
Less expenditure for capital construction (table no. 14).....						17,382,045.66
Net appropriations for Canal maintenance and operation.....						107,119,188.34
Total miscellaneous receipts covered into U. S. Treasury.....						308,240,980.12
Net appropriations for Canal maintenance and operation.....						107,140,188.34
Net capital refunds from Canal operations.....						201,091,791.78

¹ Miscellaneous appropriations for 1922, 1923, and 1924 were for increase of compensation; fiscal year 1934 covers National Recovery Act, \$1,000,000, and repatriation of unemployed aliens, \$160,000.

The balance in capital-refundment account measures the difference between Canal revenues covered into the United States Treasury as miscellaneous receipts, United States revenues, from July 1, 1921, and the net amounts appropriated for maintenance and operation of the Canal. The appropriations for maintenance and operation include provision for certain items of capital improvements, and in 1934 a separate appropriation for \$1,000,000 under the National Recovery Act also covers capital improvements. Actual cost of such improvements has been deducted from total appropriations and diverted to capital-investment account (table no. 14).

Although the foregoing table shows a net cash refundment of \$201,091.791.78, such refundment is not deductible from capital investment, which is considered as measuring the value of the Panama Canal as an instrument of public utility upon which a perpetual interest return should be earned; furthermore, interest on the capital investment chargeable to operating account is not included in cash transactions with the United States Treasury. Capital interest at 3 percent from 1922 to 1933, chargeable to operating account, would have amounted to \$206,319,253.86, as set forth in table no. 21. Had the United States Treasury actually made this interest charge against the Canal the capital refundment balance indicated would have been extinguished.

The decline in civil revenue in 1934 is principally due to a change in law authorizing postal receipts to be repaid to Canal appropriations, instead of being covered into the Treasury as miscellaneous receipts. Postal receipts pertaining to the fiscal year 1934 have therefore been applied to reduce appropriation expenditures, and only the surplus of receipts over expenditure will hereafter be deposited to the credit of United States revenues.

Miscellaneous receipts deposited in the United States Treasury prior to 1922 have been applied to equalize appropriations for operations and working capital.

TABLE No. 23.—*Balance of revenues and refundments*

DEBITS	
Revenue due U. S. Treasury (table no. 6).....	\$160,415.36
Appropriated cash in U. S. Treasury (table no. 9).....	9,461,149.74
Appropriated cash with fiscal officers (table no. 9).....	2,373,574.11
Accounts receivable (table no. 10).....	683,152.31
Stores (table no. 11).....	3,488,060.69
Work in progress (table no. 12).....	33,045.56
Deferred charges (table no. 13).....	85,552.50
Total debits.....	16,284,950.27
CREDITS	
Accounts payable (table no. 15).....	1,179,164.18
Reserve for replacements (table no. 16).....	4,180,528.13
Reserve for repairs (table no. 17).....	967,866.49
Reserve for vacation pay (table no. 18).....	440,900.46
Deferred credits (table no. 19).....	352,094.69
Total credits.....	7,120,553.95
Net current accounts.....	9,164,396.32
Less proportion under capital investment (table no. 14).....	4,120,000.00
Balance.....	5,044,396.32

A revolving fund, now fixed at \$4,120,000, is set up in Canal accounting for working capital and is credited to capital investment account in addition to funds used for construction and equipment, the total constituting the base for capital interest computations. Net working capital in excess of the revolving fund is considered as a temporary advance of Treasury funds but is usually less than appropriated funds not withdrawn from the Treasury. Working capital investments are in constant process of accrual and liquidation for account of the United States Treasury.

TABLE No. 24.—*Canal revenues*

	Fiscal year 1933	Fiscal year 1934
Tolls.....	\$19,621,158.61	\$24,065,065.16
Postal receipts.....	238,610.78	
Postal surplus.....		25,361.53
Licenses, fees, fines, etc.....	71,047.89	70,970.20
Interest.....	25.60	5.06
Miscellaneous.....	329.89	329.88
Total.....	19,931,172.77	24,161,731.83

Canal revenues shown above comprise earnings which by law must be covered into the United States Treasury as miscellaneous receipts. United States revenues, and relinquished from control of the Panama Canal, as distinguished from earnings repayable to Canal appropriations shown on tables 25 and 26.

Owing to a change in the law made effective at the beginning of the fiscal year 1934, the appropriation of postal expenses was discontinued, and postal receipts have been applied to defray such expenses, instead of being covered directly into the United States Treasury, as formerly, and only the surplus of postal receipts over postal expenses is for account of United States revenues.

TABLE NO. 25.—*Canal earnings, expenses, and net revenues—Continued*

	Expenses	Earnings	Net expenses
Executive department:			
Executive offices.....	\$340,961.00	\$124,294.56	\$216,666.44
Clubs and playgrounds.....	208,311.88	133,886.88	74,425.00
Total.....	549,272.88	258,181.44	291,091.44
Accounting department:			
Accounting office.....	365,897.88	282,709.26	83,188.62
Paymaster's office.....	39,209.60	27,918.04	11,291.56
Collector's office.....	40,259.99	34,338.00	5,921.99
Total.....	445,367.47	344,965.30	100,402.17
Washington office.....	223,170.60	46,952.97	176,217.63
Civil government:			
Civil affairs.....	18,335.52		18,335.52
Customs.....	25,200.67	314.50	24,886.17
Postal service.....	161,640.39	161,640.39	
Division of schools.....	390,701.95	32,198.20	358,503.75
Fire protection.....	110,430.42	65.78	110,364.64
Police section.....	378,393.94	63,604.25	314,789.69
District court.....	12,497.06		12,497.06
District attorney.....	4,924.72		4,924.72
Marshal.....	4,073.45		4,073.45
Magistrates' courts.....	17,263.11		17,263.11
Codification, Canal Zone laws.....	6,562.22		6,562.22
Total.....	1,130,023.45	257,823.12	872,200.33
Health department:			
Chief health office.....	14,446.47		14,446.47
Gorgas Hospital.....	562,126.67	298,807.51	263,319.16
Colou Hospital.....	112,607.26	74,552.32	38,054.94
Corozal Hospital.....	74,404.18	23,920.06	50,484.12
Palo Seco colony.....	34,910.82	25,097.25	9,813.57
Line dispensaries.....	77,949.89	27,083.70	50,866.19
Madden Dam dispensary.....	9,535.92	9,535.92	
Medical store.....	6,839.26		6,839.26
Quarantine service.....	56,029.26	16,766.90	39,262.36
Sanitation, Panama.....	33,594.26	7,770.27	25,823.99
Sanitation, Colon.....	17,672.72	2,735.71	14,937.01
Sanitation, Zone.....	129,930.25	53,621.24	76,309.01
Street cleaning and garbage collection, Panama.....	87,150.81	76,292.69	10,858.12
Street cleaning and garbage collection, Colon.....	45,945.65	42,743.15	3,202.50
Total.....	1,263,143.42	658,926.72	604,216.70
Technical divisions:			
Office engineer.....	97,323.90	63,580.45	33,743.45
Surveys.....	95,852.36	41,005.91	54,846.45
Total.....	193,176.26	104,586.36	88,589.90
Public buildings and grounds:			
Chief quartermaster's office.....	34,904.45	29,862.00	5,042.45
District quartermaster, Balboa.....	127,965.94	46,147.05	81,818.89
District quartermaster, Pedro Miguel.....	34,296.09	29,654.62	4,641.47
District quartermaster, Gatun.....	23,605.65	19,747.58	3,858.07
District quartermaster, Cristobal.....	66,167.55	27,453.44	38,684.11
Total.....	286,939.68	152,894.69	134,044.99
Marine division:			
Marine superintendent.....	16,159.67	1,446.45	14,713.22
Port captain, Balboa:			
General.....	102,305.85	5,414.05	96,891.80
Admeasurement of vessels.....	21,300.41	70.00	21,230.41
Pilotage.....	110,554.63	80,796.05	59,758.58
Handling lines.....	111,623.92	126,480.00	14,856.08
Tugs.....	97,064.99	72,632.00	24,432.99
Launches.....	79,778.35	68,364.50	11,413.85
Port captain, Cristobal:			
General.....	56,211.31	689.80	55,521.51
Admeasurement of vessels.....	21,566.67	590.00	21,176.67
Pilotage.....	153,355.21	197,390.00	14,031.79
Handling lines.....	112,198.40	133,595.50	12,397.10
Tugs.....	113,672.45	115,557.04	11,881.59
Launches.....	54,276.79	61,035.00	16,758.21
Aids to navigation.....	255,498.59	42,966.20	212,532.39
Total.....	1,335,367.24	907,126.59	428,710.65

¹ Profit.

TABLE No. 25.—*Canal earnings, expenses, and net revenues*—Continued

	Expenses	Earnings	Net expenses
Locks operation and maintenance:			
Pacific Locks:			
Miraflores Locks.....	\$390,321.96	\$19.20	\$390,302.76
Pedro Miguel Locks.....	289,329.27	60.00	289,269.27
Total Pacific Locks.....	679,651.23	79.20	679,572.03
Atlantic Locks: Gatun Locks.....	412,629.37	300.00	412,329.37
Total.....	1,092,280.60	379.20	1,091,901.40
Gatun Dam and Spillway:			
Gatun Dam.....	46,941.35	11,098.57	35,842.81
Gatun Spillway.....	3,903.89	—	3,903.89
Total.....	50,845.27	11,098.57	39,746.70
Dredging division:			
Atlantic entrance.....	223,369.62	—	223,369.62
Gatun Lake.....	145,196.52	—	145,196.52
Gaillard Cut.....	941,881.89	—	941,881.89
Miraflores Lake.....	46,212.51	—	46,212.51
Pacific entrance.....	182,227.92	—	182,227.92
Cristobal Harbor.....	3,969.51	—	3,969.51
Balboa Harbor.....	618.98	—	618.98
Removal of floating obstructions.....	38,514.35	—	38,514.35
Floating cranes, maintenance.....	38,140.67	—	38,140.67
Dredging division work.....	183,791.71	207,760.39	1,23,968.68
Total.....	1,803,923.68	207,760.39	1,596,163.29
Municipal expenses:			
Street lighting.....	18,262.41	—	18,262.41
Water for municipal purposes.....	23,400.00	—	23,400.00
Roads, streets, and sidewalks.....	142,523.22	—	142,523.22
Storm sewers.....	9,844.54	—	9,844.54
Thatcher ferry.....	68,197.73	—	68,197.73
Total.....	262,227.90	—	262,227.90
Miscellaneous general expenses:			
Proportion of general stores expense.....	182,000.00	—	182,000.00
Railroad tracks, maintenance.....	15,679.85	—	15,679.85
Recruiting and repatriating employees.....	25,928.23	—	25,928.23
Transportation on the Isthmus.....	120,000.00	—	120,000.00
Damage to vessels in Canal.....	56,696.73	—	56,696.73
Damage to vessels in Locks.....	3,220.08	—	3,220.08
Compensation of injured employees.....	690.50	—	690.50
Canal Zone experimental gardens.....	5,000.00	—	5,000.00
Depreciation of fixed property.....	1,006,625.28	—	1,006,625.28
Annual payment to the Republic of Panama.....	250,000.00	—	250,000.00
Total.....	1,665,840.67	—	1,665,840.67
Net Canal expenses.....	10,302,079.12	2,950,695.35	7,351,383.77

¹ Profit.

SUMMARY

Canal revenues (table no. 24).....	\$24,161,731.83
Net Canal expenses.....	7,351,383.77

Net Canal revenues..... 16,810,348.06

The earnings of the divisions engaged in the transiting of vessels through the Canal, as well as earnings of sanitation and civil government divisions, are deducted from gross expenses to arrive at the net expenditures from Canal appropriations, which in turn is deducted from Canal revenues to arrive at net Canal revenues, exclusive of business division profits.

Earnings of the executive offices and accounting department represent principally a proportional charge against business divisions of the Panama Canal and the Panama Railroad Co. Business divisions are reimbursed for this proportional expense by adding a surcharge to the direct cost on all work performed. The Panama Railroad's proportion is distributed to the various units of that organization.

The Government's contribution to the operation and maintenance of clubs and playgrounds was \$74,425 in 1934. All expense in excess of this amount is paid from receipts and profits from the operation of the clubhouses.

The earnings of the Washington office include \$46,600 charged against business storehouse operations to cover a proportional part of the cost of purchasing, inspection, and handling of material used by business divisions or sold to outside interests, which expense is covered through surcharges added to the price of material.

TABLE No. 26.—*Business expenses, revenues, and profit and loss*

Division	Expenses	Revenues	Profit or loss
Electric light and power system.....	\$469,492.51	\$802,224.09	\$332,731.58
Electric work.....	533,435.78	581,448.55	48,012.77
Telephone, telegraph, and signal work.....	136,910.45	152,553.93	15,643.48
Water system.....	402,698.82	491,674.16	88,975.34
Municipal work.....	995,484.76	1,069,728.09	74,243.33
Shops and dry docks.....	2,235,124.91	2,486,755.55	251,630.64
Wharves and piers.....	65,344.98	65,453.28	108.30
Fuel oil plants.....	539,642.82	737,103.00	197,460.18
General storehouses.....	5,099,534.06	5,195,533.76	95,999.70
Motor transportation.....	369,615.72	433,482.41	63,866.69
Motor car repair shop.....	154,408.11	165,464.25	11,056.14
Building repairs and construction.....	1,008,548.21	1,075,476.20	66,927.99
Panama Canal press.....	149,208.11	182,339.45	33,131.34
Gold quarters.....	503,659.45	504,231.48	572.03
Silver quarters.....	236,287.05	233,163.89	1,312.16
Rented buildings.....	54,349.36	84,412.82	30,063.46
District quartermasters' supplies.....	218,547.02	218,570.57	23.55
Hotel Tivoli.....	1,255.93	1,255.93	
Farm bureau.....	20,992.80	23,474.16	2,481.36
Nautical charts and publications.....	1,592.95	2,759.65	1,166.70
Sand and gravel.....	58,512.57	62,126.20	3,613.63
Madden Dam division.....	767,136.42	767,136.42	
Fortifications division.....	26,379.13	30,869.33	4,490.20
Public works, Panama.....	287,120.44	315,546.40	28,425.96
Public works, Colon.....	156,859.79	176,113.70	19,253.91
Total.....	14,492,142.15	15,858,897.27	1,366,755.12

¹ Denotes loss.

The profit on business operations for the fiscal year 1933 amounted to \$1,135,708.62 compared with \$1,366,755.12 shown in the foregoing table.

Profits on public works, Panama and Colon, amounting to \$47,679.87, also Economy Act impoundings, amounting to \$596,554.74, have been currently reported for coverage into general funds of the United States Treasury. The balance of the total profits.

amounting to \$722,520.51, will be immediately covered into the Treasury as miscellaneous receipts, United States revenues, in accordance with regulations.

Business operations of the Panama Canal are conducted separately from operating activities pertaining directly to the transiting of vessels and government of the Canal Zone. The annual appropriation acts for the Panama Canal authorize the use of appropriated funds for the conduct of auxiliary business activities, provided that funds so advanced are recovered through earnings and with the further proviso that any net profit derived from such business activities be covered annually into the United States Treasury.

TABLE No. 27.—*Balances in appropriation and fund accounting ledger June 30, 1934*

Assets								Total	
	U. S. Treasury appropriations	Cash on hand	Accounts receivable	Transfers available	Storehouse stock				
Maintenance and operation, Panama Canal	\$8,944,027.26	\$2,077,851.61	\$399,521.88	\$66,450.02	\$3,409,193.86	\$15,097,044.63			
Sanitation, Canal Zone, Panama Canal	5,582.85	\$7,819.05	74,332.73	55,315.00	74,192.60	301,242.33			
Civil government, Panama Canal and Canal Zone	224,655.62	57,710.95	7,647.70		2,674.23	202,118.50			
National Recovery Act, Panama Canal, 1933-35	100,000.00	91,477.88				191,477.88			
Postal funds, Panama Canal (special fund)	36,884.01	58,684.62	1,650.00			97,218.63			
Reparation of unemployed aliens, Panama Canal	150,000.00					150,000.00			
Miscellaneous receipts, United States revenues		160,315.36	100.90	722,530.51					
Total	9,461,149.74	2,533,889.47	683,252.31	846,285.53	3,488,060.69	17,012,637.74			

Liabilities								Total	
	Working capital allotment	Reserve for imponed balances	Accounts payable	Transfers payable	Contingent liabilities	General ledger reserves	Balance		
Maintenance and operation, Panama Canal	\$4,010,000.00	\$66,829.23	\$962,929.46	\$731,734.51	\$170,884.21	\$5,589,295.08	\$3,575,372.14	\$15,097,044.63	
Sanitation, Canal Zone, Panama Canal	100,000.00	7,239.57	90,483.89	43,179.04	3,229.22		57,110.51	301,242.33	
Civil government, Panama Canal and Canal Zone	10,000.00	1,6,707.10	78,931.79	67,202.47	5,809.68		137,781.66	292,118.50	
National Recovery Act, Panama Canal, 1933-35			45,181.45		1,2,176.48		148,472.91	191,477.88	
Postal funds, Panama Canal (special fund)		24,670.01	11,637.59	4,109.51	56,650.00		691.52	97,218.63	
Reparation of unemployed aliens, Panama Canal							150,000.00	150,000.00	
Miscellaneous receipts, United States revenues			882,935.87					882,935.87	
Total	4,120,000.00	92,031.71	2,062,100.05	846,285.53	233,496.63	5,589,295.08	4,069,428.74	17,012,637.74	

¹ Debit.

This table shows the status of Panama Canal working capital by the various appropriations and funds by which it is separately accountable, under existing laws and Treasury regulations.

A revolving fund of \$4,120,000 is set aside in Canal accounting to cover the net investment in current accounts, which sum is included in the capital investment account (table no. 14).

Of the \$4,069,428.74 shown as available in the balance column, \$171,499 will be used to reduce appropriation requirements in 1936, and the \$691.52 representing postal surplus is for account of United States revenues; the remainder, amounting to \$3,897,238.22 will be allotted in fiscal year 1935 to supplement Canal appropriations as follows:

	Balance, 1934	Appropriation, 1935	Allotment, 1935
Maintenance and operation, Panama Canal.....	\$3,407,613.00	\$4,971,490.00	\$8,379,103.00
Sanitation, Canal Zone, Panama Canal.....	55,912.31	768,501.00	824,413.31
Civil government, Panama Canal and Canal Zone.....	135,240.00	792,935.00	928,175.00
Repatriation of unemployed aliens.....	150,000.00	-----	150,000.00
National Industrial Recovery Act.....	148,472.91	-----	148,472.91
Total.....	3,897,238.22	6,532,926.00	10,430,164.22



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